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ADDRESS BY CHARLES C. HARRISON, A. M., LL. D.,

At the Opening of the Agnew Memorial Pavilion.

On behalf of the Trustees of the University of Pennsylvania, I gratefully accept the completed Agnew Memorial Pavilion of its Hospital. In this act the University acquires two things ; one, a valuable addition to its material possessions and facilities for its work, the other, an added measure of responsibility ; and it is my wish to say a few words on both of these subjects. The material acquisition is a large extension to the formerly existing hospital building, and a distinct step towards the completion of the original plan, which contemplated a full use of the plot of ground given to us by the city for hospital purposes. Since the first section of our buildings was erected, there have been numerous improvements in methods and materials of construction, a clearer conception of the best plans for hospital uses, and somewhat of a change in architectural sentiment; and these are all exemplified in the building in which we are now gathered. No expense has been spared in the effort to secure the best possible construction and equipment for the care and cure of patients, for the teaching of students, and for the comfort of attendants ; and I confidently look for the approval by the experts who are gathered here to-day of our plans and their execution. It is a valuable acquisition in several senses. It has cost a great deal of money, and I have no doubt fully represents the expenditure. It largely increases our facilities for the relief of the sick and suffering, for the clinical instruction of our medical students, and for our never-ending study into the causes and remedies of diseases. We are resolved that the first medical school in America shall hold the pre-eminence

which was once undisputed, and to do this, in these days of rapidly advancing science, of munificent endowments, and of energetic competition, demands an adequate enlargement and equipment of hospitals and laboratories, and all other instrumentalities that belong to medical investigation and instruction. Close upon this follows the direct and immediate benefit of the community from the enlargement of our hospital service. More people can be treated, and better treated, as the school and the hospital become more perfect. And this benefit is no longer limited to the indigent part of the community. More and more it has become appreciated that the hospital is often the best and safest place for the sufferer, whatever his circumstances may be, and to it come all kinds and conditions of men to secure the benefit of the highest skill under the most favorable surroundings. But apart from all these things, it is a valuable acquisition as a perpetual memorial of a great and good man, who, while he lived, was an honor to our University, and whose name, and we trust something of his influence, will be here perpetuated.

Dr. Agnew was a great surgeon. That means that he had a profound and accurate knowledge of anatomy, so that he knew minutely and precisely the structure with which he had to deal. It means that his mind was fertile and ingenious in contriving how to do best whatever had to be done. It means that he had the highest courage, the utmost resolution, and a strong but delicate hand. These are the essentials that almost make a great surgeon. But he had one thing more,—the one thing needful. He had in his soul the fear and love of God and love for his fellow-men that gave to his professional no less than to his personal life the serious, conscientious, and benevolent character which made him a great surgeon indeed. In the profession they speak of "cases,"—a very convenient and proper term in its place. But to Dr. Agnew, and others of his kind, each "case" is also a man, or a woman, or a little

child, in sore need, not only of science and skill, but of reverent and thoughtful and considerate and loving ministrations. And in the history of the erection of this pavilion, we may read, if we will, of how this man talked at home of his cases. His faithful wife would neither understand nor care for technical phrases about symptoms and operations ; but they could talk with earnest sympathy about men and women and little children and their sufferings, and we know that they did so talk, for in their passing they are of one mind and heart on the subject of compassion for the suffering, and here is its evidence. A memory like this, even if it were only a memory, would be something valuable.

But, as I said, we to-day inherit an added measure of responsibility. These are spacious rooms, but they must be every day in the year warmed and ventilated and lighted and cleaned. We have had to enlarge our heat and light station across the way, and must burn more coal there. We must pay more wages and buy more food and medicine from this time forth. Our medical staff must increase its labors,—perhaps its numbers. Every acquisition of this kind means a necessarily increased annual expense, which is only partly provided for in the endowments which have been given. It is not enough that the community commend the enterprise and applaud the completed work. It must sustain the work, provide the machinery with fuel ; and it is only by a steady interest in and contribution to the work that we can use to their fullest capacity the facilities which are here provided. Nor can I hold out the hope that when this is done we will lay a triumphant capstone and announce that we are satisfied. Even in this department of the University, we are sorely in need of buildings and equipments that I could tell you of. We want two or three more laboratories for special purposes, and are even now planning and thinking and begging for them.

The Provost of the University will ask no more, and be entirely satisfied, just so soon as the sum of human knowledge is completed, all investigation stopped, human suffering ended, and science finished. But I fear that I will not be that Provost.

THE GEORGE LEIB HARRISON FOUNDATION.

For the Encouragement of Liberal Studies and the Advancement of Knowledge.

The object of this announcement is to call the attention of universities, learned societies, scholars and students to the purposes of the George Leib Harrison Foundation, and to the opportunities in connection therewith, which have been opened at the University of Pennsylvania.

This Foundation, of the capital sum of \$500,000, was established June 4, 1895, as a filial memorial of George Leib Harrison, LL. D., a citizen of Philadelphia, whose philanthropic work and civic virtues largely contributed to the honor and prosperity of his native City and State.

The purposes of the Foundation are :

1. The establishment of scholarships and fellowships intended solely for men of exceptional ability.
2. The increasing of the Library of the University, particularly by the acquisition of works of permanent use and of lasting reference to and by the scholar.
3. The temporary relief from routine work of professors of ability, in order that they may devote themselves to some special and graduate work.
4. The securing men of distinction to lecture, and, for a term, to reside at the University.

Very careful provision is made in the Deed of Trust for the perpetual maintenance of the capital of the endowment; for in case of any depreciation a portion of the

interest is transferred to the capital account until the latter be reinstated.

The principal of the Endowment Fund being thus carefully safeguarded, the donor desired to make the use of the income as flexible as might be consistent with the general purposes of the Foundation, with the feeling that if too rigid conditions were imposed they might of themselves lessen the value of the Fund in future years. It was his especial wish that the income should at all times be available to the University as needs arise and opportunities offer within the general scope of the Foundation. No part of the income can be used in the erection of buildings, the endowment of professorships, or in any permanent appropriation.

Under the first provision of the Foundation, there have been established eight Scholarships, nineteen Fellowships, and five Senior Fellowships. Of the nineteen Fellowships five are not limited to any special field, so that there may be the opportunity of appointing more than one Fellow in the same subject; and also that Fellows may be assigned from time to time to subjects in which, as a rule, great interest is not felt, and for which, therefore, a permanent Fellowship would be superfluous.

The assignment of Scholarships and Fellowships at the present time is shown by the following statement:

SCHOLARSHIPS.

These are assigned to the following groups of subjects:

1. History and Economics.
2. Classical Languages.
3. Modern Languages (German and French).
4. History and Philosophy.
5. Mathematics and Physics.
6. Chemistry and Physics.
7. Biology and Chemistry.
8. English and History.

They are open to those who have taken a baccalaureate degree in the University of Pennsylvania in the courses in Arts and Science, and who have been resident students of the University for at least two years prior to graduation. They are not renewable, but the holder of a Scholarship may, on the completion of his term, become a candidate for a Fellowship. He is required to continue in resident graduate study at the University for one full academic year; he will receive free tuition from the University, and \$100 from the Foundation.

FELLOWSHIPS.

The Fellowships are assigned severally to the following subjects:

1. Classical Languages.
2. Semitic Languages.
3. Germanic Languages.
4. Romanic Languages.
5. English.
6. American History.
7. European History.
8. Political Science.
9. Economics.
10. Philosophy.
11. Pedagogy.
12. Chemistry.
13. Biology.
14. Mathematics and Astronomy.
15. Assigned for the academic year 1897-98 to Mathematics.
16. Assigned for the academic year 1897-98 to American History.
17. Assigned for the academic year 1897-98 to Indo-European Philology.
18. Assigned for the academic year 1897-98 to Sociology.

19. Assigned for the academic year 1897-98 to Semitics.

A Fellowship has the value of \$500 and free tuition; and \$100, the amount of the tuition fee usually exacted in the Department of Philosophy, is added and applied to increasing and improving the equipment of the department. There may be one renewal. There is, however, no exemption from laboratory fees.

The applicant must hold a baccalaureate degree of non-technical character; must have pursued graduate work successfully for at least one year in residence at an acceptable college or university; must have a good reading knowledge of French and German, and must not already have taken the doctor's degree. Certificates establishing these facts must accompany applications.

A Fellow must be entered in the Department of Philosophy as a candidate for the degree of Ph. D. His major subject must be the title subject of his Fellowship; if the title of the Fellowship includes more than one subject, the major and minor must be chosen from them. He will be required to devote his whole time to the prosecution of his studies in residence at the University: no teaching, or other outside work, will be permitted.

SENIOR FELLOWSHIPS.

The Senior Fellowships, five in number, are not designated by subjects. They are open only to men who have taken the degree of Ph. D. at the University of Pennsylvania. Applicants will specify the particular subject in which they propose to work.

A Senior Fellow will be required to devote himself to some work of original research in the line of his specified subject. He will also do such teaching or lecturing in his subject as may from time to time be required by the head of his department, to a maximum of four hours a week.

No other teaching or other occupation will be permitted. Residence is imperative. The income of a Senior Fellowship is \$800 per annum, and it is tenable for three years by annual renewal.

As the income of the Fund is now beginning to accumulate, the authorities of the University are preparing to give their thoughtful attention to the three other purposes of the Foundation.

PROCEEDINGS OF THE CORPORATION.

At a stated meeting, held on December 7, 1897, the following business was transacted:

Appropriate action was taken on the deaths of Dr. Harrison Allen, Emeritus Professor of Comparative Anatomy, and Dr. George Henry Horn, Professor of Entomology. The resignation of Gregory B. Keen, Esq., as Librarian of the University, was accepted, and resolutions of regret adopted. The Provost announced the gift by Thomas McKean, Esq., of \$100,000 to the Building Fund for the new Law School. A resolution of thanks was voted, and the naming of the great Law Reading Room was ordered as the Thomas McKean Hall, in honor of the donor's distinguished great-grandfather of the same name. Permission was granted to the State Live Stock Sanitary Board to perform its work at the Veterinary Department, and to erect temporary buildings if necessary. An invitation was extended to Professor Knight, of St. Andrew's, Scotland, to lecture on "Wordsworth" at Houston Hall. Thanks were voted to Dr. James V. Ingham for a collection of cryolite minerals presented by him to the Mineralogical Museum. Dr. Leonard Pearson was elected a manager of the Veterinary Hospital. Members of the Bar presented a portrait of the late Chief Justice McKean; and medical students and members of the Wormley family, a portrait of the late Professor Wormley. The Citizens'

Committee reported the collection of \$40,684.51 for the Children's Ward in the Agnew Memorial Pavilion of the University Hospital. Messrs. Burnham, Williams & Co. presented \$3000 for a free bed in the Children's Orthopaedic Ward of the Agnew Memorial Pavilion, to which were also assigned the Harriet Porter and S. Maria Deming Willard Beds for Deformed Children. Dr. H. Y. Evans, R. A. Cleemann and S. D. Risley were elected managers of the University Hospital. The George Harrison Frazier Athletic Scholarship Prize and the William West Frazier, Jr., Faculty Debating Prizes were established. Harry De Forest Smith was appointed Instructor in Greek; Merrill Smith, Instructor in Mechanical Engineering; and Abram H. Wintersteen, Lecturer on Business Law and Practice. A new paragraph was added to the constitution of the University Athletic Committee, to wit: "The committee shall have the power of vetoing the appointment of any individual employed for the athletic purposes of any team or crew of the University."

At a special meeting, held on December 20, 1897, the following business was transacted:

Dr. William Zerfing appointed Demonstrator of Operative Dentistry; Dr. Augustus O. Koenig appointed Assistant Demonstrator of Dental Histology; Dr. Samuel McC. Hamill appointed Instructor in Clinical Medicine. Leave of absence for the balance of the academic year was granted to Dr. Henry C. Cattell, Demonstrator of Morbid Anatomy. The title, "Demonstrator of Morbid Anatomy," was added to that of Dr. David Riesman, Demonstrator of Pathological Histology. The title of Dr. Frederick A. Packard was changed from "Instructor in Physical Diagnosis" to "Instructor in Clinical Medicine."

At a stated meeting, held on January 4, 1898, the following business was transacted:

The resignation of Dr. Harry Toulmin, Instructor in Physical Diagnosis, was accepted. Dr. George G. Milliken was elected

Assistant Professor of Operative Technics. The standing committees and trustee membership in other boards were appointed as follows:

STANDING COMMITTEES, 1898.

ON FINANCE AND PROPERTY:

Messrs. Morgan (Chairman); Dickson, Sims, Gest, Frazier, McKean.

ON LIBRARY AND MUSEUMS:

Messrs. Frazier (Chairman); Furness, Sims, Harris, Rosengarten.

ON COLLEGE AND DEPARTMENT OF PHILOSOPHY:

Messrs. Merrick (Chairman); Sellers, Wood, Harris, Rosengarten, Smith.

ON MEDICAL AND ALLIED SCHOOLS:

Messrs. Mitchell (Chairman); Sellers, Merrick, Wood, Lewis, Morgan.

ON LAW AND LEGAL RELATIONS:

Messrs. Dickson (Chairman); Pennypacker, Gest, Smith, Rosengarten.

ON PHYSICAL EDUCATION:

Messrs. Sims (Chairman); Mitchell, McKean, Frazier.

ON RELIGIOUS SERVICES:

Bishop Whitaker (Chairman); Messrs. Boardman, Harris, Frazier.

ON AUDIT:

Messrs. Gest, Sims.

ON UNIVERSITY:

The Provost, Messrs. Morgan, Frazier, Merrick, Mitchell, Dickson, Sims, Bishop Whitaker.

TRUSTEE MEMBERSHIP ON OTHER BOARDS.

MANAGERS OF THE UNIVERSITY HOSPITAL: Messrs. Wood, Sims, Smith, Lewis.

MANAGERS OF VETERINARY HOSPITAL: Messrs. Sims, Mitchell.

MANAGERS OF DEPARTMENT OF ARCHAEOLOGY AND PALEONTOLOGY: Messrs. Harrison, Harris, Frazier, Smith, Pennypacker, Morgan.

MANAGERS OF WISTAR INSTITUTE: Messrs. Sellers, Mitchell, Dickson, Lewis, Harris.

The annual audit of the Treasurer's accounts by expert accountants was ordered. Mrs. Matthew Baird, Miss Garrett and Professor Marquand resigned as managers of the Department of Archaeology and Paleontology, and Messrs. George D. Widener, William C. Allison, William P. Henszey and John Sparhawk, Jr., were elected. Leave of absence was granted to the Vice-Provost for the academic year 1898-99.

COMPETITION FOR THE JOHN STEWARDSON MEMORIAL SCHOLARSHIP IN ARCHITECTURE.

The Managing Committee of the John Stewardson Memorial Scholarship announces, by authority of the University Trustees, a competition for the above named scholarship. It is valued at \$1000. The holder will spend a year in travel and study of architecture in Europe under the direction of the committee.

Candidates must be under thirty years of age and must have studied or practiced architecture in the State of Pennsylvania for at least one year preceding March 1, 1898. They are required to pass preliminary examinations embracing the following points:

Freehand Drawing.—A five hours' study of an architectural subject from the east will be required at the time of the examination, either in pencil, charcoal or crayon, as the candidate may elect.

In addition each candidate will be required to show six examples of his work in pencil, color, and pen and ink.

History of Architecture.—This requires a knowledge of subjects treated in Smith and Slater's "Classic Architecture," and T. Roger Smith's "Gothic and Renaissance Architecture."

Construction.—A knowledge of Clark's "Building Superintendence," and familiarity with the use of Kidder's and Trantivine's hand-books is necessary.

French or Italian.—Candidates must be able to translate at sight any passage in Laloux's "Architecture Grecque," or an equivalent work in either language, as the candidate may elect.

These examinations will take place at the School of Architecture of the University, on March 1, 2 and 3.

No candidate will be admitted to the final examinations who fails to make 60 per cent in Construction, History, and French or Italian, and 75 per cent in Drawing.

Graduates of any of the recognized Schools of Architecture (approved by the committee), or any candidate who has in a previous year passed any preliminary examination of either this Scholarship or of the Traveling Scholarship of the University of Pennsylvania, will be exempted from such examination in this competition.

In the final examination there will be required a design for a farmhouse and farmsteading.

These buildings are to be designed for the use of a man of means whose hobby is farming. They are to form a group consisting of a farmhouse, barns, wagon sheds, farm yards, flower gardens, kitchen garden, farmer's cottage, gardener's cottage, etc.

The farm is located in Delaware County, Pa., a rolling country, well wooded and watered.

The manner of treatment and choice of materials is to be left to the competitor.

The specific requirements of the buildings, the number, kind and scale of drawings will be made known on Saturday, March 5, when each candidate will make a preliminary sketch at the School of Architecture, in the twelve hours between 10 a. m. and 10 p. m.

The final drawings will also be made at the school, which will be open to the competitors every week-day from 8 a. m. to 11 p. m. They are to be handed in at or before 10 p. m. on Saturday, March 26.

The award will be made by a jury of architects, none of whom will be members of the Managing Committee.

The Scholarship will be awarded on the result of the examination in Design; but the preliminary marks may be taken into consideration in case of doubt on the part of the jury as to the relative merits of competitors in design.

The successful competitor will be required to sail for Europe not later than April 15.

Inquiries may be made to Professor W. P. Laird, at the School of Architecture.

DEPARTMENT OF PHILOSOPHY.

The following statement with reference to the recent changes and present status of the Department of Philosophy has been drawn up by the Dean:

Changes of considerable importance have been made in the scholastic organization and rules of the Graduate School since the beginning of the academic year 1896-97. A detailed statement of these changes was made in the Provost's Report for that year.

Similar changes were made by the Corporation at the opening of the current year (1897-98) in the financial organization of the department. The practice of remitting and reducing fees has been entirely abolished, although all the privileges granted prior to June 19, 1897, will be allowed to remain in force until June, 1898.

In compensation, the Corporation has established thirty University Scholarships, carrying with them remission of tuition fees only. Appointment to these will be for the term of one year. Ten are open to competition for the current year; twenty will be open to competition in 1898-99; thirty in 1899-1900 and thereafter. They will be awarded mainly on the ground of scholarship, although preference will be given to students standing in need of aid, and holders may be twice reappointed. Only regular students will be eligible. University scholars will be allowed to do outside work only with the consent of the Executive Committee.

The Corporation has also established Honorary Fellowships, the number of which is not fixed by statute. A candidate for

an Honorary Fellowship must already have taken the degree of Ph. D. at some university whose degrees are recognized as equivalent to our own. The Honorary Fellow will be expected to pursue some work of research, or to continue his studies in his special field; will be excused from the payment of all fees; will be allowed free use of all the facilities for instruction and research offered by this University, and will be required to give instruction or assistance in the laboratory or to render to the University in some other form a definite return for the privileges granted. The amount and character of the services to be rendered must be specifically stated in the application for an Honorary Fellowship. Students who shall avow and give evidence of inability, by reason of poverty, to pay the usual tuition fees or any part of them, may be allowed to deposit with the Treasurer of the University an agreement to pay the said amount at a definite time in the future, and also a bond acceptable to the Provost for double the amount for which he becomes indebted, or equivalent security. The date of payment must lie within five years of the date upon which he severs his connection with the University, whether by taking a degree or otherwise. The length of time and terms of payment will be determined in each case with reference to its circumstances.

In all the laboratories in which graduate students are working, laboratory fees have been introduced. The fee for regular students working in any one of the four laboratories, (1) Physics, (2) Chemistry, (3) Geology and Mineralogy, (4) Botany and Zoölogy, will be twenty dollars per annum. Regular students taking work in two or more laboratories will pay twenty dollars per annum for the first laboratory and ten dollars per annum for each additional laboratory. Special students taking less than four hours' work in any one laboratory will pay a laboratory fee of five dollars per hour per annum. Special students taking four hours or more in any one laboratory will pay a fee of twenty dollars. The regulations affecting deposits, tuition, and graduation fees remain unchanged.

Senior Fellows, Honorary Fellows, and Instructors in the University who are also working in the department will be exempt from the payment of both tuition and laboratory fees. All other students, even though exempt from the payment of

tuition fees, will be required to pay laboratory and graduation fees.

The Corporation has authorized the chairmen of the several Group Committees to entrust to one or more of the Fellows working under each group, the duty of keeping a record of current publications in the title subject of his Fellowship. The Fellow will make a written report on the first day of every month, from November 1 to June 1, inclusive, to the chairman of his Group Committee.

The position of Assistant in the Department of Philosophy will hereafter be definitely recognized by the University. The Assistant will render such services to his chief as the latter shall require of him, with the provision that no Assistant shall give graduate instruction, and that the amount of time devoted to his duties shall not exceed a maximum to be defined for each case. The Assistant will be chosen by preference from the graduate students who stand in need of aid; will receive a stipend in proportion to the amount of work which he does, but will not be exempt by virtue of his position as Assistant, from the payment of fees.

The registration for the current year has been considerably affected by the adoption of the new rules, but, as the annexed table will show, the changes which their adoption has occasioned are for the welfare of the department. The total number of students in the department last year was 182. Of these 1 Senior Fellow, and the University Fellow in Botany, 38 regular students and 45 special students, a total of 85 have withdrawn, leaving 97 old students in the department. Of the 38 regular students who withdrew 19 had taken degrees, 19 withdrew for other reasons.

Upon examination the withdrawals show that the number of regular students withdrawing for other reasons than graduation is slightly diminished when compared with the figures for 1896-97. The number of special students withdrawing, however, has much increased, 28 only having withdrawn in 1896-97, and 45 in 1897-98. This has been due chiefly, if not entirely, to the more rigid enforcement of the rule requiring that candidates for the degree of Ph. D. must hold a baccalaureate degree. For some reason an impression had gone abroad

Department of Philosophy.

WITHDRAWALS AND REGISTRATIONS, TO NOVEMBER 15, 1897.

	OLD STUDENTS WITHDRAWN.			OLD STUDENTS RETURNED.			TOTALS.
	Senior, University and Honorary Fellows.	Regular Students.	Special Students.	Senior, University and Honorary Fellows.	Regular.	Special.	
1. Having taken degrees	0	19 [18]	0	3 [1]	1	1	24
2. Withdrawn for other reasons	2	19 [17]	45 [28]	0	0	0	66
3. Transferred from regular to special	0	2	0	0	0	2	2
4. Transferred from special to regular	0	0	6	0	6	0	6
5. Returned in same class	0	0	0	2	53 [70]	30 [32]	84
	2	40 [38]	51 [28]	5	60	33	182
Totals	6	97 [97]	1	37 [28]	22 [49]	158	
				Deduct absent on leave,			
				regular	6	7	
				special	1		
						151	

Note.—To facilitate comparison the figures for 1896-97 are annexed in smaller type and in brackets.

that a person not holding a baccalaureate degree would be admitted as a candidate for a higher degree after one or two years' work as a special student. It is needless to say that no greater service could be rendered to the department than the correction of this misconception. Of the old students who remained at the University, 5 have already taken the degree of Ph. D. and hold Senior, University or Honorary Fellowships; 60 are candidates for a higher degree; 33 are special students. There have been added this year, 1 University Fellow holding the degree of Ph. D.; 37 candidates for higher degrees and 22 special students, making a total of 60. The total number of students in the department, therefore, is 158. From these should be deducted 6 regular and 1 special student who are absent on leave for the current year, making the total number of students now working in the department 151, distributed as follows:—

Senior Fellows and holders of temporary and Honorary Fellowships	6
Regular students	91
Special students	54

Comparing the new students who have entered this year with those who entered last year, it is seen that the regular students have increased from 28 to 37, while the special students have decreased from 48 to 22. The increase in regular students is in part due to our system of Fellowships. Seventeen new students this year hold Fellowships as against 11 last year. The number of new regular students who have entered without receiving Fellowships has slightly increased, being 20 this year and 17 last year. The number of new special students has decreased more than 50 per cent. This is due in part to the fact above mentioned, that persons not holding a baccalaureate degree no longer expect to obtain a Doctor's or Master's degree by working first as a special student. It is also in part due to the fact that special students are now required to pay their fees in full. Last year special students paid less than 60 per cent of the fees which they owed.

It should further be remembered that the above comparison is based upon the initial registration of the current year, as compared with the total registration of the past year.

Last year between December 1 and June 1, 3 regular and 14 special students entered the department. It is probable, therefore that the figures will be considerably increased before the close of the current year. Yet there can be no doubt that the policy of raising the standard and of rigorously enforcing the rules, which is now followed by the Executive Committee, and the abolition by the Corporation of the practice of remitting and reducing fees, will diminish the number of the special students, and may affect to some extent the number of the regular students. These results were foreseen by the Executive Committee and were pointed out in its report to the Provost on the financial condition of the department, June 19, 1897.

At present the regular students as a whole are better equipped for their work than they have been in the past. Of the 22 new special students, 10 hold baccalaureate degrees and are fitted to take rank as candidates for a higher degree if they desired to do so.

Of the six special students who have been allowed this year to become candidates for a higher degree, two held baccalaureate degrees which entitled them under the rules to enter the list of regular students; one held a technical degree (M. E.); two held baccalaureate degrees which are not recognized as equivalent to our own, and had, therefore, been compelled to do work as special students for a year; one held no degree, but was admitted after a year's work on probation in recognition of the large amount of original work which he has already done in his chosen subject. One other person who holds no degree has been admitted as a candidate for a higher degree in recognition of his ripe scholarship and ability.

PUBLICATIONS OF THE UNIVERSITY OF PENNSYLVANIA.

Group I.—Annual Publications.

University Catalogue (published in December).

Fasciculi of the Departments of Philosophy (Graduate School), Law, Medicine, Dentistry and Veterinary Medicine; also Circulars of Information concerning courses offered in the College: No. 1 (School of Arts); No. 2 (Towne Scientific School); No. 3 (Courses for Teachers).

Report of the Provost (published in January).

Group II.—Serial Publications.

Series in Philology, Literature and Archæology.

Series in Philosophy.

Series in Political Economy and Public Law.*

Series in Botany.

Series in Zoology.

Series in Mathematics.

University Bulletin (monthly).

Group III.—Occasional Publications.

Reports of the Museums of Archæology and Paleontology.

Theses presented for the Degree of Doctor of Philosophy.

†Group IV.—Affiliated Publications.

Annals of the American Academy of Political and Social Science.

Americana Germanica (quarterly).

Bulletin of the Free Museum of Science and Art.

* Beginning with New Series, No. 1.

† For exchange purposes only.

EXPLANATORY.

Group I consists of publications issued annually under the direct auspices of the Provost and Trustees.

The University Catalogue is a volume of about 500 pp. It contains detailed information concerning all departments, lists of officers and students with addresses, etc. No charge is made for the Catalogue, but in all cases requests for a copy by mail must be accompanied by ten cents in stamps to cover postage.

The Fasciculus of each department contains information concerning that department *only*; while the three College Circulars of Information, covering respectively the School of Arts, the Towne Scientific School, and the Courses for Teachers, are in like manner restricted as to their contents. The Fasciculi and College Circulars are published separately after the University Catalogue, of which they are, to a large extent, reprints. Single copies are mailed free upon request.

The Report of the Provost, made by him annually to the Corporation, constitutes a general review of University activities during the year, and contains *inter alia* reports from the Treasurer and the several Deans. Single copies are mailed free upon request.

Group II consists of a number of serial publications in the several fields of literature, science and philology. They are issued in separate series at irregular intervals (for the most part), and represent the results of original research by, or under the direction of, members of the staff of instruction of the University. A complete list of these publications to date, *with prices attached*, is printed at length elsewhere. They are published under the editorial supervision of the University Publications Committee.

Group III consists of occasional publications, such as reports of the various University departments (where printed separately), and certain theses presented in partial

fulfillment of the requirements for the degree Doctor of Philosophy.

Group IV consists of affiliated publications, issued as separate periodicals, not under the control of the University, but edited in part by officers of the University of Pennsylvania. Copies are obtainable from the University only through the medium of exchange (see Exchange Bureau, below).

EXCHANGE BUREAU.

The University of Pennsylvania desires to extend its system of exchanging publications with other similar institutions and learned societies, both at home and abroad.

For convenience in correspondence, the following statement is made:

To those educational institutions and learned societies which issue only annual catalogues, reports, or similar publications, the University of Pennsylvania offers in exchange all those of its own publications classed under **Group I** and **III**, or as many of them as may be specified.

To those educational institutions and learned societies publishing *also* results of original investigations, the University of Pennsylvania offers in exchange any one of its equivalent series in **Groups II** and **IV**, or as many of them as may be mutually agreed upon in order to maintain a proportionate ratio of exchange.

In establishing a system of exchanges with any other institution, the University of Pennsylvania binds itself to the following regulations:

All publications agreed upon to be forwarded from Philadelphia to address furnished, immediately upon issue, free of expense to our correspondent.

In return, the University requests compliance with the following:

All publications to be forwarded to "Library of the University of Pennsylvania, Philadelphia, Pa.," marked "Ex-

change Bureau" in lower left-hand corner, immediately upon issue, free of expense to us.

Orders for single numbers, or sets of Serial Publications under **Group II**, and all correspondence relating to the publications of this University, should be addressed to

J. HARTLEY MERRICK, *Assistant Secretary,*
Station B, Philadelphia, Pa.

LECTURES BY CANON CHEYNE.

A course of six lectures on "Jewish Religious Life after the Exile" was delivered in the College Chapel during January by the Rev. T. K. Cheyne, M. A., D.D., Oriel Professor of the Interpretation of Holy Scripture at Oxford, and Canon of Rochester. The lectures were given at four o'clock on the afternoons of January 3, 6, 10, 13, 17 and 20, under the auspices of the University, and under the direction of the following committee : Charles C. Harrison, William A. Lamberton, Rev. E. T. Bartlett, Rev. Joseph May, W. W. Frazier, C. E. McMichael, George S. Fullerton, Rev. W. N. McVickar, Rev. J. Andrews Harris, J. G. Rosengarten, Joseph S. Harris, Mayer Sulzberger, Morris Jastrow, Jr., Rev. H. C. Trumbull, Taleott Williams.

The several topics were as follows :

- I. Religious Life in Judea before the Arrival of Nehemiah.
- II. Nehemiah, Ezra, and Manasseh ; or, the Reconstitution of the Jewish and Samaritan Communities.
- III. Jewish Religious Ideas ; Hindrances to Their Perfect Development.
- IV. Jewish Wisdom—Its Meaning, Object, and Varieties.
- V. Orthodox and Heretical Wisdom ; Contemporary Levitical Piety.
- VI. Judaism—Its Power of Attracting Foreigners ; its Higher Theology ; its Relation to Greece, Persia, and Babylon.

PORTRAITS OF MEDICAL PROFESSORS.

The University is at present in possession of the following collection of portraits of professors who have held chairs in the Medical Faculty. The portraits are hung in Medical Hall.

JOHN MORGAN,

Professor Theory and Practice of Medicine . 1765 to 1789
WILLIAM SHIPPEN,

Professor of Surgery, etc. 1765 to 1805
BENJAMIN RUSH,

Professor of Chemistry 1769 to 1789

Professor Theory and Practice of Medicine . 1789 to 1791

Professor of Institutes of Medicine and Clinical Medicine 1791 to 1813

JAMES HUTCHINSON,

Professor of Chemistry and Materia Medica . 1789 to 1793
CASPAR WISTAR,

Adj. Professor of Anatomy, etc. 1791 to 1808

Professor of Anatomy 1808 to 1818

JAMES WOODHOUSE,

Professor of Chemistry 1795 to 1809

PHILIP SYNG PHYSICK,

Professor of Surgery 1805 to 1819

Professor of Anatomy 1819 to 1831

THOMAS C. JAMES,

Professor of Midwifery 1810 to 1835

NATHANIEL CHAPMAN,

Professor of Materia Medica 1813 to 1816

Professor Theory and Practice of Medicine and Clinical Medicine 1816 to 1850

Professor Institutes of Medicine 1816 to 1835

ROBERT HARE,

Professor of Chemistry 1818 to 1847

WILLIAM GIBSON,

Professor of Surgery 1819 to 1855

WILLIAM P. DEWEES,

Professor of Midwifery 1825 to 1834

Professor of Obstetrics 1834 to 1835

GEORGE B. WOOD,	
Professor of Materia Medica and Pharmacy	1835 to 1850
Professor Theory and Practice of Medicine and Clinical Medicine	1850 to 1860
SAMUEL JACKSON,	
Professor of Institutes of Medicine	1835 to 1863
HUGH L. HODGE,	
Professor of Obstetrics	1835 to 1863
JOSEPH CARSON,	
Professor of Materia Medica and Pharmacy	1850 to 1875
HENRY H. SMITH,	
Professor of Surgery	1855 to 1871
WILLIAM PEPPER, SR.,	
Professor Theory and Practice of Medicine and Clinical Medicine	1860 to 1864
FRANCIS GURNEY SMITH,	
Professor of Institutes of Medicine	1863 to 1877
RICHARD A. F. PENROSE,	
Professor of Obstetrics	1863 to 1888
ALFRED STILLÉ,	
Professor Theory and Practice of Medicine and Clinical Medicine	1864 to 1884
WILLIAM GOODELL,	
Professor of Gynaecology	1873 to 1894
JOHN NEILL,	
Professor of Clinical Surgery	1876 to 1878
THEODORE G. WORMLEY,	
Professor of Chemistry and Toxicology	1877 to 1897

DEPARTMENT OF LECTURES.

This new department was established as the result of a desire on the part of the University to come into close contact with educational centres throughout the State. The intent of the Corporation in instituting this system of lectures is best outlined in a letter circulated by Provost Harrison, of which the following is a copy :

Dear Sir :—The University of Pennsylvania is constantly striving to come more directly in touch with the people of this Commonwealth. It must be that there are many communities in which the University might be genuinely helpful, provided the professors of the institution were to go thither and present in lectures the latest and best scientific and literary thought.

This the University is willing to do to the extent of its present ability. It proposes to send its best men to deliver, without charge, lectures in such places and under such local auspices as will secure the attendance of a creditable number of interested citizens. The expense of a suitable hall and local advertisement to be in each case borne by the community; all other expenses by the University.

Does this plan seem to you a significant advance in higher education for the people? Will you please make any suggestions which occur to you as likely to be of assistance in this work; and will you not endeavor to bring into existence such a local organization as may be necessary to secure lecturers as indicated above?

All requests for lecturers should be addressed to the secretary of the committee in charge, at as early a date as possible.

Yours very truly,
CHAS. C. HARRISON, *Provost.*

As will be seen from the above, the intention is not to conflict in any way with the work carried on by the Society for the Extension of University Teaching (which has no official connection with the University), but to enable the University to come into direct contact, through its staff of professors and alumni, with the constituency from which it draws so large a number of its students.

The responses received to the University's offer have been so numerous as to justify belief in the wisdom and propriety of such a move. The lectures given are not "courses" in any sense, but simply individual addresses upon subjects of live educational import, delivered free by the University's own professors, the topics in many cases being adapted to the local needs of the community where the lecture is given.

The scope of the system employed in the Department of Lectures, and the variety of topics on which lectures have thus far been delivered, may be seen from the following table:

Department of Lectures.

Town.	County.	Date.	Lecturer.	Subject.
Athens . . .	Bradford . . .	Nov. 12	R. P. Falkner . . .	Political Economy.
Bethlehem . . .	Northampton . . .	Oct. 29	J. B. McMaster . . .	American History.
Butler . . .	Butler . . .	Dec. 3	R. P. Falkner . . .	Political Economy.
Corry . . .	Erie . . .	Dec. 4	C. G. Child . . .	English.
Chester . . .	Chester . . .	Dec. 17	M. D. Learned . . .	German.
Erie . . .	Erie . . .	Dec. 3	C. G. Child . . .	English.
Franklin . . .	Venango . . .	Dec. 4	R. P. Falkner . . .	Political Economy.
Franklin . . .	Venango . . .	Dec. 16	J. T. Rothrock . . .	Botany.
Dushore . . .	Sullivan . . .	Dec. 30	J. T. Rothrock . . .	Botany.
Harrisburg . . .	Dauphin . . .	Dec. 4	J. H. Penniman . . .	English.
do. . .	do. . .	Dec. 10	M. D. Learned . . .	German.
do. . .	do. . .	Dec. 17	A. W. Goodspeed . . .	Physics.
Honesdale . . .	Wayne . . .	Dec. 4	E. R. Johnson . . .	Journalism.
Hanover . . .	York . . .	Dec. 10	J. T. Rothrock . . .	Botany.
Honey Brook . . .	Lancaster . . .	Dec. 17	J. W. Harshberger . . .	Botany.
Johnstown . . .	Canbria . . .	Dec. 10	A. W. Goodspeed . . .	Physics.
Kennett Sq. . .	Chester . . .	Dec. 2	M. P. Ravenel* . . .	Hygiene.
Lebanon . . .	Lebanon . . .	Nov. 11	R. P. Falkner . . .	Political Economy.
do. . .	do. . .	Nov. 26	J. F. Johnson . . .	Journalism.
do. . .	do. . .	Dec. 11	D. C. Munro . . .	Medieval History.
Lititz . . .	Lancaster	M. D. Learned . . .	German.
New Brighton . . .	Beaver . . .	Nov. 20	C. G. Child . . .	English.
do. . .	do. . .	Nov. 19	E. G. Conklin . . .	Comp. Embryology.
New Castle . . .	Lawrence . . .	Nov. 19	C. G. Child . . .	English.
do. . .	do. . .	Nov. 20	E. G. Conklin . . .	Comp. Embryology.
Norristown . . .	Montgomery . . .	Dec. 10	R. P. Falkner . . .	Political Economy.
Pottstown . . .	do. . .	Nov. 13	J. H. Penniman . . .	English.
Phillipsburg . . .	Centre . . .	Nov. 14	G. S. Fullerton . . .	Philosophy.
Pittsburg . . .	Allegheny . . .	Nov. 23	E. G. Conklin . . .	Comp. Embryology.
do. . .	do. . .	Nov. 22	E. G. Conklin . . .	Comp. Embryology.
Rebersburg . . .	Centre . . .	Dec. 13	G. S. Fullerton . . .	Philosophy.
Ridgway . . .	Elk . . .	Dec. 27	J. T. Rothrock . . .	Botany.
Scranton . . .	Lackawanna . . .	Dec. 27	J. H. Penniman . . .	English.
Troy . . .	Bradford . . .	Nov. 13	R. P. Falkner . . .	Political Economy.
Tunkhannock . . .	Wyoming . . .	Dec. 23	M. P. Ravenel* . . .	Hygiene.
Unionville . . .	Chester . . .	Nov. 27	J. W. Harshberger . . .	Botany.
West Chester . . .	Chester . . .	Oct. 22	M. P. Ravenel* . . .	Hygiene.
do. . .	do. . .	Oct. 22	A. W. Miller . . .	Materia Medica.
Columbia . . .	Lancaster . . .	Sept. 22	M. G. Brumbaugh . . .	Pedagogy.
do. . .	do. . .	Sept. 22	J. T. Rothrock . . .	Botany.
do. . .	do. . .	Sept. 23	M. P. Ravenel* . . .	Hygiene.
do. . .	do. . .	Sept. 23	J. T. Rothrock . . .	Botany.
do. . .	do. . .	Sept. 24	N. C. Schaeffer* . . .	Education.
do. . .	do. . .	Sept. 24	S. C. Schmucker . . .	Botany.

All requests for lecturers should be addressed to the Secretary of the Department of Lectures, Eugene Ellicott, 400 Chestnut Street, Philadelphia.

* Not on University Staff.

NOTES.

Dr. W. N. Bates read two papers at the last meeting of the American Philological Association.

1. **The Date of the Poet Tyrtaeus**: A discussion of the novel theory recently advanced by Dr. Verrall.

2. **A Fifteenth Century Manuscript of Cicero de Senectute**: A description of a manuscript in Dr. Bates' possession.

Dr. Bates has been granted leave of absence for a year, and will spend this time in study in Greece. During his absence his place will be filled by Henry De Forest Smith, A. M.

The course in Pausanias, offered by Dr. Bates and announced in the Catalogue, will be omitted during the year 1897-98, and in its place Mr. H. DeF. Smith offers a course in Introduction to the Critical Study of Homer.

Dr. A. Gudeman has published a paper entitled **Notes on Tacitus**, in the last number of the *Classical Review*.

Dr. Simon N. Patten, Professor of Political Economy, is on leave of absence during the present year. Dr. Patten is spending the winter in London, where he is engaged in research upon the history of economic thought in England. During his absence his work has been divided among Drs. Seager, Lindsay and Falkner.

An article by Professor Falkner on **Crime and the Census**, which appeared in the January number of the *Annals* of the American Academy of Political and Social Science, has been translated into German and published in the new *Zeitschrift für Criminanthropologie*, etc.

The July issue of the *Annals* of the American Academy of Political and Social Science contains an article by Professor L. S. Rowe on the **Problems of Political Science**. In this essay Professor Rowe discusses the reasons for the stagnation and aridity of political science in England, where the concise and definite, but narrow conceptions of the Austinian school of

jurisprudence have not been superseded. Admirable in its analysis, the school of Austin is weak in synthesis. Political reasoning has thus far avoided the evolutionary doctrines whose application has been so fruitful in all fields of research, and has failed to gain a conception of its subject and method in harmony with modern thought.

Dr. James T. Young, Instructor in Administration, contributed to the September *Annals* of the American Academy of Political and Social Science, a treatment of English administration, under the title **Administrative Centralization and Decentralization in England**. His theme is the justice of the peace, whose independent and paternal rule in local affairs has been so much diminished in the present century.

In May last Professor Falkner resigned his position of first vice-president and acting president of the American Academy of Political and Social Science. The place was filled by the election of Professor Samuel McCune Lindsay.

In the political and social sciences a joint seminary has been established for the current year under the charge of a committee consisting of Professors Seager, Rowe, Lindsay and Falkner, chairman. The work of the seminary for the year will be devoted to a single topic, **The Effect of Economic Changes in the United States upon Social, Political and Industrial Organization**. Under this general head a number of subjects for papers have been selected, which will permit variety of topics. At the same time it is hoped that the plan will give to the work a coherency and sustained interest which has often been found wanting in seminary work both at home and abroad.

Two courses have been added to the graduate work in English Literature; a course in the History of English Literary and Rhetorical Criticism, conducted by Dr. Homer Smith, and a course of Middle English Literature, conducted by Dr. Child. This latter course will probably be extended over the entire year.

Among the publications of the corps of instructors in the Department of English may be mentioned especially the **War of the Theatres**, by Dr. Josiah H. Penniman, an investigation into the personal satire contained in the plays of Jonson, Marston and Dekker about the year 1600. This paper appears in the *Publications of the University of Pennsylvania* in a series devoted to Philology, Literature and Archaeology. Dr. Homer Smith contributed to the current number of the *Publications* of the Modern Language Association of America a paper on **Pastoral Influence in the English Drama**. Both of these papers have been the outcome of graduate studies pursued during recent years at the University of Pennsylvania.

At the recent meeting of the Modern Language Association, held at the University in December, 1897, Dr. Child presented a paper upon **The Origin and Growth of the Seventeenth Century "Conceit;"** Dr. Eva March Tappan, lately a holder of one of the Bennett Fellowships at the University, read a paper on **Nicholas Breton**; and Professor Felix E. Schelling a paper on **Ben Jonson and the Classic School**.

THE NEW GLASSHOUSES AT THE BOTANIC GARDEN.

The origin and steady development of the University Botanic Garden within the last three years have been chronicled from time to time. The past few weeks have brought a most important addition to the hothouse accommodation, thanks to the continued interest and support of Provost Harrison.

The collections of greenhouse and hothouse plants had increased so rapidly during the past two years that the healthy growth of each specimen was seriously hampered. The large amount of work carried on by undergraduate and graduate classes during the winter necessitated also ample greenhouse facilities. Such have been provided for in the recent additions. These include a house 38 x 11 feet, which connects with the older houses and with the Biological Hall, while it opens into a new palm house, 58 x 28 feet. From the upper end of the latter extends a house 26 x 12 feet, which connects directly with the

janitor's house. As now arranged every section of the Biological Department is thus brought into direct communication. It will be possible now to group the plants in a manner that will prove effective for teaching purposes, and to conduct experiments in plant physiology with some degree of success.

With these ends in view, the old glasshouse next to the laboratory of plant physiology has been utilized in part as a temperate house, in part for the conduct of experiments by students. Collections of acacias, eucalypts, azaleas, laurels and half-hardy bulbous plants are here grouped together. This house connects with a recent addition, the larger part of which contains about one hundred and twenty species of sub-tropical ferns, salvinias, isoetes and selaginellas. The remaining space is devoted to the growth of sarracenias, Venus fly-traps, oxalids and begonias.

From the last house open three sections, one of which is utilized as a propagating and store house, another built three years ago, contains typical collections of nepenthes, bromeliads, marantas, orchids, sensitive plants, etc.; while the lower end, constructed as a water tank at the suggestion of the late Professor Ryder, has proved of great service in the winter growth of aquatics.

The new palm house is already well filled with a representative set of palms, aroids, crotons, gingers, cycads, sugar cane, and other species that require considerable space. Though these have only occupied their new quarters for about five weeks, their improved appearance is noteworthy. The remaining glass structure is used as a succulent house, and is already filled with cacti, euphorbias, kleinias, crassulas, agaves, aloes, etc.

ABSTRACTS OF RECENT PAPERS.

Recent Papers from the Botanical Department.

An effort has been made during the past year to organize a society for the study of plant morphology and physiology, to meet annually with the American Society of Naturalists. A highly successful gathering took place at Cornell University during the Christmas recess, when upwards

of forty botanists from the Eastern States were present. Twenty-six papers were submitted, six of which were from the University of Pennsylvania.

Professor J. M. Macfarlane, who was elected a vice-president, read a communication on "A Mycorhiza in the Roots of the Liliaceous Genus *Philesia*." The intimate union between fungus and flowering plant was traced, the nutritive aid rendered by the former to the latter was favorably commented on; but contrary to the opinion of Frank and others, the constant presence of a fungus in the host-plant roots was regarded as slowly but surely deleterious.

Dr. J. W. Harshberger exhibited and described "Arrangements for Water Storage and Conduction in *Senecio praecox*." This species was found by him growing in abundance on the dry hills near the capital of Mexico. Portions of the stem gathered eighteen months ago, and since left in a dry room, continued to retain their vitality. This was shown to be due to a peculiar structural disposition of the pith cells, which permitted the storage and slow utilization of considerable supplies of moisture absorbed during the brief annual rain period of that country.

Dr. Martha Bunting read a paper on "The Formation of Cork-tissue in the Roots of the Rosaceæ." The annual formation of cork layers; the presence in these for considerable periods of starch and nuclei; the varying conditions exhibited in different species of the order, and the bearing of the structural details on questions of evolution were discussed.

Miss Caroline Thompson made a preliminary report on "The Internal Phloem of the Southern Jessamine." The large development of this tissue in climbing stems, like the present, its relation to the leaves, and its use in rapidly conducting elaborated sap were spoken of.

Dr. J. M. Macfarlane submitted part of a Ph. D. thesis by Dr. Lucy L. W. Wilson, entitled "Observations on the American Squaw-Root" (*Conopholis Americana*). The parasitism of this plant on oak roots, the large canker-like swellings there formed, the extremely reduced and degraded condition of the parasite, and the intimate organic connection existing between it and the oak were traced. The microscopic structure of the different parts was described and illustrated by drawings. It was said to resemble strikingly some South American and East Indian parasites belonging to other plant alliances.

A short paper from Dr. A. F. Schively, in continuation of her recent article in our "Botanical Contributions," treated of the striking modifications which resulted in fruit production when aerial purple flower-buds of the Hog Peanut were buried in soil. The bearing of this on the question of acquired characters, and the hereditary transmission of these, was emphasized.

The Asters in Fertilization and Cleavage.

E. G. CONKLIN.

[Abstract of paper read before the American Morphological Society at Ithaca, N. Y.
December 29, 1897.]

In *Crepidula* and several other genera of marine gasteropods there is a well marked centrosome and sphere in both polar spindles. In the metaphase this centrosome is a single densely-staining body; in the anaphase it greatly enlarges, and the center of the body does not stain; in the telephase it becomes a large sphere with an extremely thin surface layer, containing a large number of coarse granules. During this metamorphosis the centrosome has changed its staining reactions; in the prophase and metaphase it takes only nuclear stains; in the telophase it takes only plasma stains; while in the anaphase it takes both.

Though the spermatozoon frequently enters before the first polar body is formed, no sperm aster appears until the metaphase of the second polar spindle. This aster is large and conspicuous, though not as large as the aster of the second polar spindle which remains in the egg; it frequently contains several dark-staining granules. At the same time one or more accessory asters appear in the egg; these are much smaller than either the egg or sperm aster, and no centrosome could be found in them. The sperm and egg asters become very large and have the same structure and staining reactions, the radiations from them proceeding for some distance through the egg. Each remains in close contact with its own nucleus, so that there is no possibility of confusing or mistaking them. When the pronuclei come together the asters also come into contact. The origin of the cleavage centrosomes has not yet been satisfactorily determined.

In the prophase of the first cleavage the chromatin is clearly distinguishable into two kinds, oxychromatin and basichromatin; the latter only takes part in forming the chromosomes, the former becomes arranged like beads on the spindle fibres and is apparently drawn to the two poles. It seems to take no part in the formation of the daughter nuclei and probably forms a part of the granular substance of the sphere. All the cleavage centrosomes undergo a metamorphosis similar to that of the polar spindles, and in the telephase of each cleavage the poles of the spindle are occupied by a granular sphere frequently as large as the nucleus, or even larger. These spheres in every case move to those portions of the cells which lie nearest the polar bodies. In this position they can be recognized through one and in some cases two or three subsequent divisions. It results from this fact that after the first two cleavages the sphere substance is differentially distributed to the different cells, the entire sphere substance of one generation always going into those cells of the next generation which lie nearest the animal pole. This differential distribution of the spheres has been followed through every cleavage up to the twenty-four-cell stage. As the form of cleavage is perfectly constant, it follows that the sphere substance of any

generation goes into certain definite cells which have a perfectly constant origin and destiny. This differential distribution of the spheres is not caused by their specific weight, since their movements are the same in whatever position the egg may be placed. It seems to be the result of a form of polarity which, like that of the egg itself, is not the result of gravity.

The centrosomes do not apparently arise from the sphere substance of the previous division, but some distance from it; and the sphere substance itself never divides, but each sphere ultimately grows ragged at its periphery and gradually fades out into the general cytoplasm.

The differential distribution of these spheres and their subsequent conversion into cytoplasm suggests that they may be important factors in the differentiation of the cleavage cells, and if further investigation should establish the fact that the spheres are in part composed of the oxychromatin of the nucleus it would furnish a basis in fact for certain well-known speculations of DeVries, Weismann and Roux.

Ben Jonson and the Origin of the Classical School.

FELIX E. SCHELLING.

[Abstract of a paper read at the meeting of the Modern Language Association, Philadelphia, December 27, 1897.]

Starting with the antithetical terms "romantic" and "classical," and affirming the co-existence both of classic and romantic art in all ages, as elements of different intensity, three manifestations of the classical spirit in literature are distinguished from the Renaissance to the reign of Queen Anne. These are (1) the empirical classicism of Sir Philip Sidney, busy with externals such as theorizing upon the Greek unities and the introduction of classical measures into English verse; (2) the assimilative classicism of Ben Jonson, based on that poet's temperament and deep scholarship; and (3) the conventionalized or pseudo-classicism of Alexander Pope.

A contrast was then drawn between the manner of Spenser, *i. e.* Spenser's way of imitating and interpreting nature artistically by means of poetic expression, and the manner of Jonson. Spenser was chosen as the representative, as he was the leader of a large school of poets, his contemporaries and successors, and his manner was described in brief as consisting of a sensuous love of beauty involving the power of pictorial representation, a use of classical imagery for decorative effect, a fondness for melody of sound, and a flowing sweetness and continuousness of diction, involving diffuseness at times. In contrast, the manner of Jonson involves a sense for form, a sense of finish, reserve and self-control. In a word, the antithesis between the two poets is that of romanticism and classicality.

Then followed a discussion of Jonson's relations to his time, especially in his literary dictatorship. It was shown that the subject matter of

Jonson's non-dramatic verse contained practically all the varieties of poetry subsequently practiced by Dryden and Pope. It was established (1) that Jonson wielded the greatest literary influence of his time; (2) that this influence was exerted chiefly upon the scholarly and cultivated classes; (3) that this influence extended until long after the Restoration; and (4) that it made directly for the classical ideal and lasted while that ideal lasted. A brief enumeration of existing theories set forth to explain the origin of the transformation that came over English Literature between the reigns of Queen Elizabeth and Queen Anne followed. It was urged that while the form of versification was of value in indicating the nature of this change, weight must be given to many other considerations.

The second part of this paper was devoted to a discussion of the thesis that every trait which came to prevail in the poetry of the new classical school is directly traceable to the influence and example of Ben Jonson. Attention was called to the attitude of Jonson toward the prevalent literary taste of his age: his contempt for popular judgment, his criticism of his contemporaries—Sidney and Spenser among them—and his objection in general to the romanticism of his day. This position was explained as that of a professional man who had a theory to oppose and an amateurishness and eclecticism of his time. In this respect Jonson's position was stated to be much that of Matthew Arnold in his exclamation, "Amid the bewildering confusion of our times I seemed to myself to find the only sure guidance, the only solid footing, among the ancients." Some of Ben Jonson's theories which betray the classicist were set forth: his belief in the rhetoric of Quintilian, in the criticism of Horace, and that English drama must follow the ancients; but these theories were shown to be none the less reasonable and liberal, and his position, in general, to be that of a man desirous of applying the canons of the past to conditions which he recognized as different in the present. The restrictions of classicity in practice as contrasted with matters of theory were then considered; among them Jonson's tendency to precise and pointed antithetical diction, his slightly Latinized vocabulary, his occasional preference for abstract over concrete expression, and his somewhat conventionalized metrical form. His practice in this last particular was shown to be entirely in accordance with his theories expressed in his conversations with Drummond and elsewhere. It was shown that in Jonson's non-dramatic verse the decasyllabic rhymed couplet is all but his constant measure; that in Jonson's hands this became the habitual measure for occasional verse, and sanctioned by his usage, remained such for a hundred and fifty years. It was shown that not only did Jonson's practice and theory thus coincide, but also that the practice of no other poet exemplified like characteristics to anything approaching the same extent until we pass beyond the accession of Charles I.

Illustrations were then given to show the nature of the versification of several poets preceding and contemporary with Jonson. Spenser's *Mother Hubbard's Tale*—comparison having been made with the couplets

of Marlowe, Drayton, Chapman and others—was considered as being like a specimen of Spenser's decasyllabic couplet and verse displaying the typical Spenserian manner. Jonson was considered in specimens ranging from the year 1603 to 1631; Sandy in translation and in original verse, while Waller, Dryden and Pope were all considered in their earlier and in their later manners. These tests took into consideration (1) the number of run-on couplets, (2) the number of run-on lines, (3) the character of the line as to internal cæsura, especially in the contrast which exists between the continuous line and that exhibiting an internal cæsura so placed as to produce the effect of splitting the line into two halves. The results of this consideration, show first, a gradual decrease in the number of run-on couplets and run-on lines through Spenser, through Jonson and Dryden to Pope, but they show also a division of these six poets into two groups with respect to the use and non-use of the continuous line; Sandy's, contrary to the usual theory on this subject, showing a close affiliation to the manner of Spenser; and Jonson, grouping with Waller, Dryden and Pope. A further examination into Jonson's use of antithesis and other devices of the later classical manner show that he contained in his versification as in his style and in his theory, all those qualities which in a more developed form came finally to characterize the style and versification of the so-called "Classical Age;" and that these things could be affirmed of no other poet contemporary with Jonson's earlier career.

In conclusion attention was called to the liberality of Jonson's spirit despite his own strong preferences, and to the eclecticism of his practice which had much to do, with other influences, in delaying the coming of the following age of restriction. This is especially exemplified in Jonson's two disciples: Robert Herrick and Edmund Waller. Both owed much to Jonson, but Waller especially carried on the classical spirit of the lyric which he impoverished and conventionalized, and in occasional verse, for which he possessed a peculiar talent.

The Poetry of Nicholas Breton.

EVA M. TAPPAN.

[Abstract of a paper read at the meeting of the Modern Language Association, Philadelphia, December 28, 1897.]

The paper opened with a glance at the great events of the age in which Breton lived and their failure to produce any visible effect upon his poetical works. He was classified as a religious poet, who made literary departures into *vers de société*, satire and pastoral. His *vers de société* received little praise, and its one gem, "A Sweet Lullabye," was claimed for Gascoigne.

As a satirist, Breton was regarded as a literary descendant of Gascoigne, his satire having little in common with that of Hall, Donne, or Marston. His religious verse shows, it was stated, two of the marks of the real hymn.

(1) It embodies a real, or seeming real, individual experience; (2) it manifests no consciousness of the audience. His freedom in religious composition was ascribed to his conventional and uncontroversial disposition, and to the fact that his creed consisted of but three articles, namely: (1) Wrong is punished; (2) Right is rewarded; (3) Repentance wins forgiveness. Breton knew nothing of the theological pessimism of Gascoigne, nothing of the ecstasies of Southwell, nothing of the higher selfishness of Thomas à Kempis; but he was a simple, true-hearted Christian man, who meant to do his best, and was sorry when he failed. His religious verse, always tender, sweet and hopeful, developed into rare earnestness, clearness of vision, and an exquisite eagerness of child-like longing and trust. The verbal style of these religious writings shows the delight in words common to all Elizabethans, a proof of their appreciation of a form of life so intangible that we, unhappily, have lost much of their delicate sensitiveness to its existence.

The pastoral of the sixteenth century was in perfect accord with three of the leading tendencies of the age. (1) The inherent English love of nature and simplicity. (2) The healthy liking for the marvelous, fostered by the great events of the age. (3) The keen interest in human nature that was to find its highest development in the drama. Breton's pastoral was regarded as proceeding from love of nature combined with close study of human nature. The interest taken by Elizabeth in his first pastoral, "Phyllida and Corydon," was explained by its possible connection with the Earl of Leicester's entertainment given to the Queen in 1578. The pastoral and erotic verse of Breton was compared with that of Sannazaro, Googe, Surrey, Wyatt, Turberville, Spenser, Llyl, Sidney and Gascoigne. His association with Gascoigne was treated as being probably more intimate than is generally supposed.

Breton's independence of character and his intellectual modesty were discussed. His popularity with the same audience that admired far greater poets was ascribed, aside from his literary merits, (1) to his following the literary lines of least resistance; (2) to his power to please an unusually varied audience, resulting from his ability to combine in each kind of verse qualities that most writers would have found inharmonious.

The paper closed with a résumé of the literary criticism which Breton had received during the past three hundred years.

MEETINGS OF THE BOTANICAL SOCIETY OF PENNSYLVANIA.

In the latter part of October, a reception and scientific meeting took place in the Biological Department. It resulted in the formation of the Botanical Society of Pennsylvania. Provost and Mrs. Harrison in the afternoon, Vice-Provost and Mrs. Fullerton in the evening, received the company, which numbered about two hundred and fifty.

Interesting scientific addresses were given in the lecture hall of the department, while the different rooms were filled with microscopic and general biological objects. Provost Harrison, in opening the meeting, stated that it now seemed an opportune time to organize a botanical society, since the development of the Botanic Garden had become an acknowledged success. He then called on Professor Macfarlane to explain the objects of the Society.

Since that time five fortnightly meetings have been held. Communications, alike instructive and valuable, have been made, and the membership has steadily increased to upwards of one hundred. The Council of the Society aim at bringing together all students of plant-life, to place these in close contact with the Botanical Department, and thereby to extend the usefulness of the Botanic Garden.

At the sixth meeting, held in the lecture hall of the Harrison Chemical Laboratory, a large audience enjoyed the following program:

1. "Our Oak Trees," illustrated with numerous specimens and lantern slides; by Dr. Emily G. Hunt.
2. "The Fungous Diseases of the Oaks," by Dr. J. W. Harshberger.
3. "A History of the Origin, Structure and Uses of Galls of the Oaks," illustrated with microscopic slides; by Professor Henry Kraemer, of the Philadelphia College of Pharmacy.

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- b. **Exploration of an Indian Ossuary on the Choptank River, Dorchester Co., Md.** With a description of the crania discovered by E. D. Cope; and an examination of traces of disease in the bones, by Dr. R. H. Harte.
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3. **Descriptions of Three New Polychæta from the New Jersey Coast.** By J. PERCY MOORE. (Plates III-IV.)

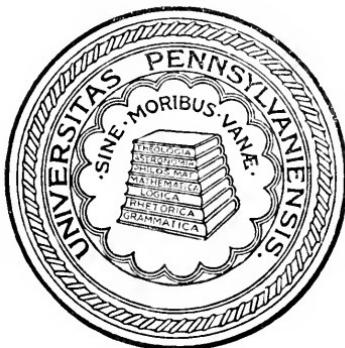
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4. **On the Embryos of Bats.** By HARRISON ALLEN, M. D. (Plates V-VIII.)

Publications
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University Bulletin.

Volume II. Number 2.



Founded 1740.

PHILADELPHIA :
PUBLISHED FOR THE UNIVERSITY OF PENNSYLVANIA.
MARCH, 1898.



UNIVERSITY DAY, 1898.

The exercises held by the University of Pennsylvania on February the twenty-second, 1898, in commemoration of the birth of George Washington, First President of the United States, were rendered noteworthy by the presence of William McKinley, Twenty-fifth President of the United States, who made the address of the day before the officers and students of Pennsylvania, at the Academy of Music, Philadelphia.

The ceremonies of the day were divided into two parts: the commemorative exercises at the Academy, and a reception and luncheon to the President at the University Library. President McKinley arrived in Philadelphia on the afternoon of Monday, February 21, and was at once driven to the residence of the Provost of the University, whose guest he was during his stay in the city. On the morning of the twenty-second, students of the University to the number of about two thousand assembled by departments at the University, and, preceded by the University Band, marched to the Academy of Music, the route of the procession being as follows: down Walnut street to Eighteenth street, down Eighteenth street to Locust street, down Locust street to the Academy of Music. As the procession passed the residence of the Provost on Locust street, it was reviewed by the President. Shortly after, the President, accompanied by the Provost, and escorted by the Veteran Corps, First Regiment Infantry, N. G. P., Colonel T. E. Wiedersheim, Commanding, drove to the Academy of Music, where he was met and preceded in his entry to the stage by the procession of officers of instruction, trustees, and invited guests of the University, in full academic dress. The military escort of

the President from the lobby to the stage consisted of the Army and Navy officers stationed in Philadelphia, under the honorary command of Captain John C. Watson, U. S. N. Upon the entrance of the President, the immense audience arose and greeted him with prolonged applause and cheers, while the band played "Hail to the Chief." The following is the full program of the exercises:

SELECTIONS *The Municipal Band*
 ACADEMIC PROCESSION
 PRAYER *The Bishop of Pennsylvania*
 NATIONAL HYMN—"America"
 INTRODUCTION *The Provost of the University*
 ADDRESS *The President of the United States*
 UNIVERSITY HYMN—"Hail! Pennsylvania"

BENEDICTION

THE HYMNS.

"AMERICA."

My country, 'tis of thee,
 Sweet land of liberty,
 Of thee I sing;
 Land where my fathers died,
 Land of the pilgrim's pride,
 From ev'ry mountain side
 Let freedom ring.

My native country, thee—
 Land of the noble free—
 Thy name I love;
 I love thy rocks and rills,
 Thy woods and templed hills;
 My heart with rapture thrills
 Like that above.

Our fathers' God—to Thee,
Author of liberty,
 To Thee we sing;
Long may our land be bright
With freedom's holy light;
Protect us by Thy might,
 Great God, our King.

“HAIL! PENNSYLVANIA.”

Hail! Pennsylvania,
 Noble and strong,
To thee with loyal hearts,
 We raise our song.
Swelling to Heaven, loud
 Our praises ring;
Hail! Pennsylvania,
 Of thee we sing.

Majesty, as a crown,
 Rests on Thy brow;
Pride, Honor, Glory, Love,
 Before thee bow.
Ne'er can thy spirit die,
 Thy walls decay;
Hail! Pennsylvania,
 For thee we pray.

Hail! Pennsylvania,
 Guide of our youth,
Lead thou thy children on
 To light and truth;
Thee, when death summons us,
 Others shall praise,
Hail! Pennsylvania,
 Thro' endless days!

At the conclusion of the proceedings, the President left the Academy accompanied by the Provost, and was driven to the University Library, under the escort of the First Troop Philadelphia City Cavalry, Captain John C. Groome, Commanding. Upon arrival at the Library, the President was received by the Vice-Provost, assisted by the Deans of the several faculties. A brief reception was extended by the President to about four hundred guests. The latter were introduced by the Vice-Provost, and included the Trustees, administrative officers, professors and assistant professors of the University; the heads of educational institutions in Pennsylvania and neighboring States; Army and Navy officers; members of the consular service in Philadelphia; and representatives of the bench and bar, of the clergy and of the business life of the city. Immediately after the reception came the luncheon, the guests of honor at the President's table being the following, in order from left to right: Hon. Charles F. Warwick, Mayor of Philadelphia; Dr. John Marshall, Dean of the Medical Faculty; Hon. James T. Mitchell, Justice of the Supreme Court of Pennsylvania; Henry T. Pritchard, Superintendent U. S. Coast Survey; Hampton L. Carson, Esq., representing the Dean of the Law Faculty; Clement A. Griscom, Esq., President of the International Navigation Company; Captain Silas Casey, U. S. N., Commandant at League Island Navy Yard; Dr. Edward C. Kirk, Dean of the Dental Faculty; Colonel J. M. Whittemore, U. S. A., Commandant at Frankford Arsenal; Dr. Leonard Pearson, Dean of the Veterinary Faculty; Captain John C. Watson, U. S. N., Governor of Naval Home; Dr. Charles K. Mills, Dean of the Faculty Auxiliary to Medicine; J. Addison Porter, Esq., Private Secretary to the President; Dr. Josiah H. Penniman, Dean of the College Faculty; Right Reverend Ozi W. Whitaker, Bishop of Pennsylvania; Hon. Seth Low, President of Columbia University; Joseph S. Harris, Esq., President of the Philadelphia and Reading

Railway Company; the President of the United States; Dr. George S. Fullerton, Vice-Provost of the University.

At the end of this high day, the President, accompanied by the Provost, was driven to the station, taking the train thence direct to Washington.

The weather throughout was all that could be desired, while the occasion itself will go down into the history of the University of Pennsylvania as one replete with the greatest dignity and significance.

The invocation by the Bishop of Pennsylvania, the introduction by the Provost of the University and the address of the President of the United States are recorded verbatim below.

INVOCATION BY THE BISHOP OF PENNSYLVANIA.

"Almighty God, our Heavenly Father, we come to Thee as Thy children to thank Thee for Thy great mercies. We thank Thee that Thou hast given us this land to be our home, for civil and religious liberty, for all that we are permitted to see and know of the increase of knowledge, the continual revelation of powers and properties which Thou didst create, but which men have so long failed to discern. Grant, O Lord, that we may tread reverently in the paths which Thou hast permitted us to enter, and that all our learning may lead us to know Thee more perfectly, and to adore Thee as the fountain of all power and knowledge and wisdom and goodness, through Jesus Christ our Lord.

"We thank Thee that when Thy purposes for this land were unfolding Thou didst raise up Thy servant, George Washington, to be the guide and leader of this people; to be their Commander in war and their Chief Magistrate in peace, and that by him Thou didst conduct them through struggle and peril and strife, to victory and its fruits.

“Grant, O Lord, we beseech Thee, that we and all this people may be animated by his spirit and follow his example ; that we may never use opportunities that come in our way for the advancement of personal interests at the cost of the public welfare ; that our zeal for the success of a party may never be stronger than our love for our country ; and that whether our station be high or low, according to the standards of men, we may always regard ourselves Thy servants, whose highest privilege, as well as duty, is the faithful doing of Thy will.

“ May Thy blessing, O God, rest upon the University of Pennsylvania ; that it may be more and more a centre of sound learning and good influence ; that its sons may go forth from year to year to reinforce the best citizenship of the State, and to be each one an embodiment of justice and truth and fidelity to principles ; and that they may thus fulfill their course with honor and usefulness in this life, and attain the high destiny which Thou hast made possible for them in the life to come, through Jesus Christ our Lord. Amen.

“ Most gracious God, we humbly beseech Thee, as for the people of these United States in general, so especially for their Senate and Representatives in Congress assembled ; that Thou wouldest be pleased to direct and prosper all their consultations to the advancement of Thy glory, the good of Thy Church, the safety, honor and welfare of Thy people : that all things may be so ordered and settled by their endeavors upon the best and surest foundations, that peace and happiness, truth and justice, religion and piety may be established among us for all generations. These and all other necessaries for them, for us and Thy whole Church, we humbly beg in the name and mediation of Jesus Christ, our most blessed Lord and Saviour. Amen.

“ O Lord, our heavenly Father, the high and mighty Ruler of the universe, Who dost from Thy throne behold all the dwellers upon earth, most heartily we beseech Thee

with Thy favor to behold and bless Thy servant, the President of the United States, and all others in authority; and so replenish them with the grace of Thy Holy Spirit that they may always incline to Thy will and walk in Thy way. Endue them plenteously with heavenly gifts; grant them in health and prosperity long to live, and finally, after this life, to attain everlasting joy and felicity through Jesus Christ, our Lord. Amen.

“Direct us, O Lord, in all our doings this day with Thy mighty power, and further us with Thy continual help, that in all our works begun, continued and ended in Thee, we may glorify Thy Holy Name, and finally, by Thy mercy, obtain everlasting life through Jesus Christ, our Lord. Amen.

“The grace of our Lord Jesus Christ, and the love of God, and the fellowship of the Holy Ghost, be with us all evermore. Amen.”

INTRODUCTION BY THE PROVOST OF THE UNIVERSITY.

MR. PRESIDENT, STUDENTS OF THE UNIVERSITY, LADIES AND GENTLEMEN :

The traditions which belong to the great seats of learning are a priceless heritage. We cannot too often dwell upon them. The memory of them becomes not only the forerunner of hope, but the motive and mainspring of action. Each university in our beloved country has its peculiar associations. It is not the least of these associations that, with one exception, all of those upon our Atlantic coast had their foundation almost at the beginning of our history. It is the pride of Harvard that she was founded six years after the first house was built in Boston, and when there were not over 5000 people in the settlements of Massachusetts Bay. It is the pride of William and Mary

and of Yale that each was founded when Connecticut and Virginia were unsubdued wilderness. It is the pride of Columbia that she was founded when there were but 13,000 people on Manhattan Island. It is the pride of Pennsylvania that she was founded when there were not 15,000 people between the Delaware and Schuylkill. It should be the pride of all of us, because the fact itself proves that universities are an essential consequence to a race, and that a people who so early in their history laid these foundations will not willingly let any one of them perish. Their life will be coterminous with that of the nation, and when they perish the nation will perish likewise.

It is the peculiar pride of the University of Pennsylvania that so much of her history is associated with the years during which Washington was the servant of his country. Of whatsoever others may boast, we justly feel that we have pre-eminence in this relation; and now, in these later years, in the vigor of renewed youth, we have consecrated the twenty-second of February as our "University Day," with a propriety that cannot be challenged. Upon what academic roll can be found the names of such illustrious men, companions of Washington, in the service of their country and of humanity, as those of Franklin, founder and trustee; of Robert Morris, friend of Washington, and the man who, with Washington and Franklin, rendered the most signal service during so many years of trial; of Francis Hopkinson, signer of the Declaration of Independence, Chief of the Navy Department, trustee of the University of Pennsylvania; of John Nixon, trustee, who read the Declaration of Independence to the townspeople who were assembled at the State House—the original broadside from which he read still being in existence and owned in Philadelphia by one of his descendants; of Thomas McKean, trustee, signer of the Declaration of Independence, President of the Continental Congress, Chief Justice of the State of Pennsylvania, Governor of the State of Pennsylvania.

Who may reckon among their students, graduated just before the Revolutionary War and active participants in the struggle, such names as those of Hopkinson, to whom I have just referred ; of Jacob Duche, Chaplain of the Continental Congress ; of John Morgan, Physician-in-Chief to the American Armies ; of Major-General Dickinson ; of Mifflin, Aide-de-Camp to General Washington ; of John and Lambert Cadwalader, and of Tench Tilghman, Military Secretary and Aide-de-Camp to General Washington, chosen by him to bear his dispatch to Congress announcing the surrender of Cornwallis ?

Seven years of Washington's Presidential life were spent in Philadelphia, and these at a time when the area of the city was circumscribed within a short radius ; when its institutions were few in number, and when a comparatively small group of its citizens were the active spirits in affairs. These men met each other face to face every day in the week, and whatever was of moment was better known and more discussed in the familiarity of their daily intercourse than even in these days of ours. Washington's residence was within a few blocks of the University. He was in constant intercourse with its White and Franklin, and Provosts Smith and Ewing. His associates in the Continental Congress, in military operations and in Federal administration, were its Rittenhouse, its Morgan, its Bingham, its Francis Hopkinson, its McKean, its Shippen, and its Robert Morris. From the Executive Mansion, Bushrod Washington went in daily attendance on its law course, under James Wilson, the first Justice of the Supreme Court. The President and Mrs. Washington, Mr. and Mrs. Robert Morris, Mr. and Mrs. Alexander Hamilton, and all the members of the Cabinet were of those who graced the occasion of the opening of the Law School of the University, in the old Academy Building, at Fourth and Arch streets—still the property of the University.

During Washington's Presidency, two of his nephews, George Steptoe and Lawrence Augustine Washington, took here their degrees as Bachelor of Arts. In 1783 the University of Pennsylvania conferred upon Washington its highest honorary degree.

The theme of to-day's ceremonies is the "Memory of Washington." No place is more fitted for it or more hallowed by its associations than Philadelphia and the University of Pennsylvania. Upon no less exalted theme could the University of Pennsylvania have asked the President of the United States to deliver the address, and I doubt whether there be any other occasion upon which his acceptance would have been given. For many years the University has been steadfast in the celebration of this high day, and in later years, with increasing zeal, to make the occasion more and more worthy of its subject. But never since the day when the President of the United States, General Washington, opened the Law School of the University have we been honored by the presence and voice of a President, to speak in the name of the University, of the first of that illustrious line. The President will address to-day those who gratefully feel his gracious act, in that amid the cares and duties of his exalted office he has counted it worthy of his time and effort to be our orator upon this occasion. I speak for the Trustees, for the Faculties, for the University students, for the City, and for the entire State, when I thank him for his acceptance of our invitation, and welcome him to the University so closely connected in its earlier days with the "Father of His Country."

I have the distinguished honor of presenting the Trustees, the Faculties and the students of the University, and their guests—this great audience—to the President.

ADDRESS BY THE PRESIDENT OF THE UNITED STATES.

MR. PROVOST, OFFICERS AND STUDENTS OF THE UNIVERSITY OF PENNSYLVANIA, LADIES AND GENTLEMEN :

We celebrate here, as in every part of our country, the birthday of a great patriot, who assured the beginning of a great nation. This day belongs to patriotism and the people. But in a certain sense the University of Pennsylvania has special reasons for honoring the twenty-second of February. For over half a century, with ever-increasing popularity and public recognition, you have observed the occasion either as a holiday or with patriotic exercises, participated in by faculty and students. No other American institution of learning has a prouder title to the veneration of Washington's memory than this, whose foundation was laid in colonial days, nearly fifty years before Pennsylvania became a State; whose progress was largely due to the activity of Franklin and other zealous and far-seeing patriots, and whose trustees were on terms of sufficient intimacy with Washington to congratulate him upon his election to the Presidency, and to receive from him a notable reply which has passed into the history of the times.

Washington, too, belonged to the brotherhood of the alumni of this institution, having accepted the degree of Doctor of Laws, conferred upon him in 1783—an honor doubtless the more appreciated when he recalled the events which gave him close and peculiar attachment to the city of Philadelphia.

No wonder that your great University has made the twenty-second of February its most impressive ceremonial, and devoted its annual exercises to special tributes to the memory of the first President of the United States, and the patriotic themes which cluster thickly about his life and work. I rejoice with you in the day. I rejoice, also, that throughout this broad land the birthday of the patriot

leader is faithfully observed and celebrated with an enthusiasm and earnestness which testify to the virtue and gratitude of the American people.

It would not be possible, in the comparatively short time to which these exercises must to-day be limited, to follow Washington in his long and distinguished services at the head of the army, and as Chief Executive of the Government. My purpose is simply to call to your attention a few points in Washington's career which have singularly impressed me, and to refer to some passages in his writings that seem peculiarly appropriate for the guidance of the people, who, under our form of government, have in their keeping the well-being of the country.

In its entirety Washington's public life is as familiar to the American student as the history of the United States. They are associated in holy and indissoluble bonds. The one is incomplete without the other. The one cannot be written without the other. Washington's character and achievements have been a part of the school books of the nation for more than a century, and have moved American youth and American manhood to aspire to the highest ideals of responsible citizenship. With enduring fame as a great soldier, the world has recognized his equal accomplishments in the paths of statesmanship. As a soldier he was peerless in the times in which he lived, and as a statesman his rank is fixed with the most illustrious in any country or in any age.

But with all our pride in Washington we not infrequently fail to give him credit for his marvelous genius as a constructive statesman. We are constantly in danger of losing sight of the sweep and clearness of his comprehension, which accurately grasped the problems of the remote future and knew how to formulate the best means for their solution. It was committed to Washington to launch our ship of state. He had neither precedent nor predecessor to help him. He welded the scattered and at times antago-

nistic colonies into an indestructible Union, and inculcated the lessons of mutual forbearance and fraternity which have cemented the States into still closer bonds of interest and sympathy.

From the hour when Washington declared in his Virginia home that he would raise 1000 men and equip them at his own expense to march to the defence of Boston, he became the masterful spirit of the Continental army and the mightiest single factor in the continent's struggle for liberty and independence. Apparently without personal ambition, spurning royal honors when they were suggested to him, he fulfilled a still more glorious destiny as the guiding force of a civilization freer and mightier than the history of man had ever known.

Though Washington's exalted character and the most striking acts of his brilliant record are too familiar to be recounted here, where so many times they have received eloquent and deserved eulogy, yet often as the story is retold it engages our love and admiration and interest. We love to recall his noble unselfishness, his heroic purposes, the power of his magnificent personality, his glorious achievements for mankind, and his stalwart and unflinching devotion to independence, liberty and union. These cannot be too often told or be too familiarly known.

A slaveholder himself, he yet hated slavery and provided in his will for the emancipation of his slaves. Not a college graduate, he was always enthusiastically the friend of liberal education. He used every suitable occasion to impress upon Congress and the country the importance of a high standard of general education, and characterized the diffusion of knowledge as the most essential element of strength in the system of free government. That learning should go with liberty, and that liberty is never endangered so long as it is in the keeping of intelligent citizens, was the ideal civic code which his frequent utterances never failed to enforce.

And how reverent always was this great man; how prompt and generous his recognition of the guiding hand of Divine Providence in establishing and controlling the destinies of the colonies and the Republic. Again and again—in his talks, in his letters, in his State papers and formal addresses—he reveals this side of his character, the force of which we still feel, and I trust we always will.

At the very height of his success and reward, as he emerged from the Revolution, receiving by unanimous acclaim the plaudits of the people, and commanding the respect and admiration of the civilized world, he did not forget that his first official act as President should be fervent supplication to the Almighty Being who rules the universe.

It is He who presides in the councils of nations and whose providential aid can supply every human defect. It is His benediction which we most want,; and which can and will consecrate the liberties and happiness of the people of the United States. With His help the instruments of the citizens employed to carry out their purposes will succeed in the functions allotted to public life.

But Washington on this occasion went further and spoke for the people, assuming that he but voiced the sentiment of the young nation in thus making faith in Almighty God, and reliance upon His favor and care, one of the strong foundations of the Government then inaugurated. And proceeding, Washington states the reasons for his belief in language so exalted that it should be graven deep upon the mind of every patriot :

“ No people can be bound to acknowledge and adore the invisible hand which conducts the affairs of man more than the people of the United States.

“ Every step by which they have advanced to the character of an independent nation seems to have been distinguished by some token of providential agency ; and in the important revolution just accomplished, in the system of their united government, the tranquil deliberations and

voluntary consent of so many distinct communities from which the events resulted cannot be compared with the means by which most governments have been established without some return of pious gratitude, along with an humble anticipation of the future blessings which the same seems to presage. These reflections arising out of the present crisis have forced themselves strongly upon my mind.

" You will join with me, I trust, in thinking that there are none under the influence of which the proceedings of a new and free government are more auspiciously commenced."

The Senate of the United States made fitting response of its appreciation of this portion of the President's inaugural address when its members declared that "a review of the many signal instances of divine intervention in favor of the country claims our most pious gratitude, and that they were inevitably led to acknowledge and adore the Great Arbiter of the Universe by whom empires rise and fall."

Congress added its sanction by providing that "after the oath shall have been administered to the President, he, attended by the Vice-President and the members of the Senate and House of Representatives, proceed to St. Paul's Chapel to hear divine services performed by the Chaplain of Congress already appointed."

Not alone upon days of thanksgiving or in times of trial should we, as a people, remember and follow the example thus set by the fathers, but never in our future as a nation should we forget the great moral and religious principles which they enunciated and defended as their most precious heritage.

In an age of great activity, of industrial and commercial strife, and of perplexing problems, we should never abandon the simple faith in Almighty God as recognized in the name of the American people by Washington and the First Congress.

But if a timely lesson is to be drawn from the opinions of Washington on his assuming the office of President, so also is much practical benefit to be derived from the present application of portions of his Farewell Address, a document in which Washington laid down principles which appeared to him "all important to the permanence of your felicity as a people."

In that address, Washington contends in part :

(1) For the promotion of institutions of learning ; (2) for cherishing the public credit ; (3) for the observance of good faith and justice toward all nations.

One hundred years ago free schools were little known in the United States. There were excellent schools for the well-to-do, and charitable institutions for the instruction of boys and girls without means ; but the free public school, open alike to the children of the rich and poor and supported by the State, awaited creation and development. The seed planted by the fathers soon bore fruit. Free schools were the necessary supplement of free men.

The wise and liberal provisions for public instruction by the fathers, second only in effect to their struggle for the independence and creation of the Union, were destined at no distant date to produce the most wonderful results.

As the country has grown education, fostered by the State, has kept pace with it. Rich as are the collegiate endowments of the old world, none of them excel in munificence the gifts made to educational institutions by the people of the United States and by their governments, in conformity with "the influence which sound learning has on religion and manners, on government, liberty and laws." Adams and Madison, Jefferson and Hamilton, Sherman and Trumbull, Hancock, Jay, Marshall, the Clintons, and many others of our early statesmen, were scarcely less earnest and eloquent than Washington himself in pleading the cause of sound and liberal education for the people.

Nor does this seem surprising when we reflect that the truest aim and worthiest ambition of education is not finished scholarship for the favored few, but the elevation of a high standard of citizenship among the many.

I have had peculiar satisfaction in the fact that Washington in those early days, when engrossed with mighty governmental problems, did not forget his contributions for the education of the poor, and left in his will a bequest to be dedicated to free public instruction. Nothing better tells the value he placed upon knowledge as an essential to the highest and best citizenship.

How priceless is a liberal education! In itself what a rich endowment! It is not impaired by age, but its value increases with use. No one can employ it but its rightful owner. He alone can illustrate its worth and enjoy its rewards. It can not be inherited or purchased. It must be acquired by individual effort. It can be secured only by perseverance and self-denial. But it is free as the air we breathe. Neither race nor nationality nor sex can debar the earnest seeker from its possession. It is not exclusive, but inclusive in the broadest and best sense. It is within the reach of all who really want it, and are brave enough to struggle for it. The earnest rich and the worthy poor are equal and friendly rivals in its pursuit, and neither is exempted from any of the sacrifices necessary for its acquisition. The key to its title is not the bright allurements of rank and station, but the simple watchword of work and study.

A liberal education is the prize of individual industry. It is the greatest blessing that a man or woman can enjoy when supported by virtue, morality and noble aims. But the acquirement of learning in our schools and colleges seems so easy that we are apt to underestimate its value and let the opportunity to win it slip by, until, regretfully, we find that the chance is gone. The rudiments must be ingrafted in youth, or, with rare exceptions, they are forever lost.

Life to most is a struggle, and there is little time for the contemplation of the theoretical when the practical is pressing at every hand. Stern duty monopolizes our time. The command of others controls our preferences, and often defeats our intentions. By steadily adhering to a firm purpose amid the activities of life we may keep in touch with the literature of the day ; but to go back to the classics, or to grapple with the foundations of the sciences is beyond the power of most men when they have entered upon their chosen business or profession.

One's mental fighting, often a hand-to-hand conflict with obstacles and temptations, is a battle of his own, a campaign whose motive force is individuality rather than circumstances or luck. Work in the mental world is as real as that in the physical world. Nor has any prescription yet been found to take the place of application and self-denial and personal struggles which have given to the world its greatest leaders and noblest achievements.

"Cherish the public credit." How much both of reflection and instruction is combined in this simple admonition of the "Father of His Country." The United States emerged from the bitter and prolonged struggle of the Revolutionary War exhausted financially, and with a hundred existing perplexities and difficulties which remained to be solved before the financial credit of the new nation could be established at home and demonstrated abroad.

But Washington knew how to gather around him and place in positions of the greatest trust the able financiers and economists, whose names the country still venerates and whose great work it still enjoys. Hamilton and Morris and Gallatin and others were successful in establishing the Treasury, and inaugurating the financial operations of this Government upon principles which recognized that the most enduring basis of national credit was national honor, and that whatever other assets we might have or acquire, that was indispensable, first, last and all the time,

if we would cherish the public credit. We have been fully rewarded all along our history by adhering to the principles of Washington in keeping the public faith. Before half a century had passed we had paid off our national debt, and had a balance in the Treasury. Another debt, the greatest in our history, was incurred in the Civil War for the preservation of the Union. But this did not exceed the resources or discourage the intentions of the American people. There were those who suggested repudiation, but the people repudiated them and went on unchecked, discharging the obligations of the Government in the coin of honor.

From the day our flag was unfurled to the present hour no stain of a just obligation violated has yet tarnished the American name. This must and will be as true in the future as it has been in the past. There will be prophets of evil and false teachers. Some part of the column may waver and wander away from the standard, but there will ever rally around it a mighty majority to preserve it stainless.

At no point in his administration does Washington appear in grander proportions than when he enunciates his ideas in regard to the foreign policy of the Government : "Observe good faith and justice toward all nations, cultivate peace and harmony with all ; religion and morality enjoin this conduct. Can it be that good policy does not equally enjoin it ? It will be worthy of a free, enlightened and at no distant period a great nation to give to mankind the magnanimous and too novel example of a people always guided by an exalted justice and benevolence."

To-day, nearly a century from Washington's death, we turn reverentially to study the leading principles of that comprehensive chart for the guidance of the people. It was his unflinching, immovable devotion to these perceptions of duty which more than anything else made him what he was and contributed so directly to make us what

we are. Following the precepts of Washington, we cannot err. The wise lessons in government which he left us it will be profitable to heed. He seems to have grasped all possible conditions and pointed the way safely to meet them. He has established danger signals all along the pathway of the nation's march. He has warned us against false lights. He has taught us the true philosophy of "a perfect union," and shown us the grave dangers from sectionalism and wild and unreasonable party spirit. He has emphasized the necessity at all times for the exercise of sober and dispassionate public judgment. Such judgment, my fellow-citizens, is the best safeguard in the calm of tranquil events, and rises superior and triumphant above the storms of woe and peril.

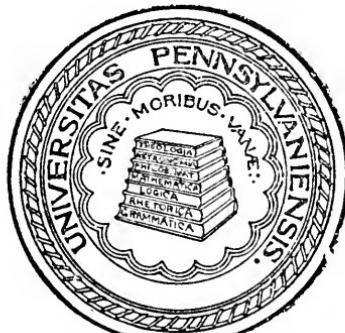
We have every incentive to cherish the memory and teachings of Washington. His wisdom and foresight have been confirmed and vindicated after more than a century of experience. His best eulogy is the work he wrought, his highest tribute is the great Republic which he and his compatriots founded. From 4,000,000 we have grown to more than 70,000,000 of people, while our progress in industry, learning and the arts has been the wonder of the world.

What the future will be depends upon ourselves, and that that future will bring still greater blessings to a free people I cannot doubt. With education and morality in their homes, loyalty to the underlying principles of free government in their hearts, and law and justice fostered and exemplified by those entrusted with public administration, we will continue to enjoy the respect of mankind and the gracious favor of Almighty God. The priceless opportunity is ours to demonstrate anew the enduring triumph of American civilization, and to help in the progress and prosperity of the land we love.

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A CORRECTION,

On page 6 of the March issue of the BULLETIN, the name of Dr. William Romaine Newbold, Dean of the Department of Philosophy (Graduate School), should have appeared in the list of those seated at the President's table at luncheon on University Day. The Hon. James T. Mitchell, Justice of the Supreme Court of Pennsylvania, whose name appeared in the list above referred to, was prevented at the last moment from attending.

PROCEEDINGS OF THE CORPORATION.

At a stated meeting, held on February 1, 1898, the following business was transacted :

Twelve managers of the University Hospital were elected, nine upon nomination of the Contributors, and three upon nomination of the Medical Faculty. Thirty-six managers of the Department of Archaeology and Paleontology were elected upon nomination of the Archaeological Association. The Treasurer of the University was authorized to receipt for the \$5000 legacy of the late William Wyman, to endow a free bed in the Children's Orthopædic Ward of the Hospital. The Provost was directed to express the thanks of the Corporation to Mrs. Arthur Biddle, of Philadelphia, for the gift of her late husband's law library to the Biddle Library. Thanks were voted to Dr. E. Otis Kendall, LL. D., Honorary Vice-Provost of the University, for his gift to the Corporation, through the Provost, of his Mathematical library. Mr. James McCrea, of Pittsburgh, was elected a Trustee of the University, *vic* John Scott, deceased. Thanks were voted to the several donors of funds during the past month. Appropriations of \$2000

to various departments for books, and of \$1000 for periodicals, were approved. The Rev. Edward T. Shanahan, of the Catholic University of America, was engaged to deliver a series of lectures on Mediæval Philosophy to the students of the Department of Philosophy (Graduate School) during the absence of Professor George S. Fullerton, in 1898-99.

Certain modifications in the rules governing admission to the Department of Philosophy were duly approved. Dr. Edgar Arthur Singer, Jr., was appointed Instructor in Philosophy, beginning with September 1, 1898.

At a stated meeting, held on March 1, 1898, the following business was transacted:

The resignation of the Rev. Dr. George S. Fullerton, as Vice-Provost of the University was accepted. The resignation of Dr. Vickers Oberholtzer as Instructor in Technical Chemistry was also accepted. Miss Bertha N. Dechert, of Philadelphia, was elected a Manager of the Graduate Department for Women. The Faculty of Medicine was authorized to include the name of Dr. John Wilson among the graduates of the Department of Medicine, as of the class of 1796. Thanks were voted to donors of funds, to N. M. Rittenhouse, Esq., for gift of fossils, and to Messrs. E. Otis Kendall, Horace Howard Furness and Joseph G. Rosengarten for gifts of books.

At a stated meeting, held on April 5, 1898, the following business was transacted :

Resolutions were adopted on the death of the late Thomas McKean, a member of the Board. Thanks were voted to Mr. George C. Thomas, for Wordsworth paintings ; to Messrs. G. and S. S. Bryan, for old receipt book ; to the Judges in the competition for the John Stewardson

Memorial Traveling Scholarship in Architecture; to Mr. George W. Vanderbilt, for botanic specimens; to Messrs. R. S. Peabody, and F. Hopkinson Smith, for their lectures under the auspices of the School of Architecture; and to donors of University funds. The following appointments were made: Thomas H. Montgomery, Jr., Ph. D., Lecturer on Zoölogy; Horatio C. Wood, Jr., M. D., Demonstrator of Pharmacodynamics; James McCrea, trustee, on Committees of Finance and Property, and College and Department of Philosophy. Plans for the collection of fees in the College, and for an increase in Dormitory rentals, were approved. Nominations to Fellowships and Scholarships in the Department of Philosophy, for the year 1898-99, were confirmed. A plan for the issue of uniform diplomas was approved.

CANDIDACY IN THE DEPARTMENT OF PHILOSOPHY.

At its stated meeting, December 20, and at a special meeting held January 24, the Faculty of Philosophy undertook the consideration of the regulations touching candidacy for the higher degrees. It has been found that the present rule, which admits to candidacy any person holding a baccalaureate degree in Arts or Science granted by some institution whose degrees are regarded by this University as equivalent to its own, was at once too broad and too narrow. Too broad, because in all the larger American universities a process of specialization has set in which has resulted in destroying the relatively fixed value which formerly attached to the degrees of A. B. and S. B. Too narrow, for the same reason, since students who did not hold the required degrees were found to have had an education which fully equipped them for graduate work. Early in December, the Dean made inquiries of twenty-two leading institutions with reference to the conditions under which they accepted students as candidates for the higher degrees, and submitted the material which he had collected to the Faculty

at the two meetings above mentioned. The Faculty finally reached the following conclusions :

1. That it is not desirable, save under the most exceptional circumstances, to admit students to candidacy for the higher degrees unless they already hold a baccalaureate degree.
2. That students who hold a baccalaureate degree should not be admitted to candidacy without a thorough inquiry into their past education, native ability and fitness for their work.
3. That in view of the establishment of such an inquiry, it will be possible to accept other baccalaureate degrees than those in Arts and Science hitherto required.
4. That the inquiry in question should be directed mainly toward the student's fitness for the advanced work which he proposes to undertake.
5. That although no one who is not possessed of a broad general education should be admitted to candidacy, it is not possible to formulate definite standards to govern such matters. Each case must be judged upon its merits.
6. That no student should be accepted for candidacy unless he already has a reading knowledge of two European languages, one of which must be a modern tongue.

These provisions were incorporated in the following rules, which were approved by the Board of Trustees at a stated meeting held February 1, 1898:

ADMISSION.

1. Admission to the Graduate School will be granted by the Dean to persons holding a Bachelor's degree in Arts, Letters, Philosophy, Pure or Applied Science, granted by the University of Pennsylvania, or by any college or university whose degrees are recognized by this University, provided the applicant be found prepared to undertake the graduate work selected. This does not include degrees in Law, Music, Theology, Medicine, Dentistry, Veterinary Medicine or Pharmacy, but persons holding these degrees and other persons of suitable age and attainments may be admitted by a special vote of the Executive Committee. Admission to the Graduate School does not imply candidacy for a degree.

2. Upon application to the Dean, persons may, with the consent of the officer of instruction, be admitted as auditors to any course.

CANDIDACY.

3. Graduate students who hold a Bachelor's degree in Arts or Science, Philosophy or Letters, may be accepted by the Executive Committee for the degrees of Master of Arts or Master of Science, if application be made at least six months before the examination for the degree.

4. Graduate students who wish to become candidates for the degree of Doctor of Philosophy must make application to the Executive Committee at least one academic year before the examination for the degree.

5. The application must be endorsed by the chairman of the Group Committee in which the applicant proposes to take his major subject and shall contain:

(a) A certificate setting forth that he possesses the linguistic knowledge required by the rules. This certificate shall be signed by an examiner appointed by the chairman of the corresponding linguistic group.

(b) A statement accompanied by any diploma or certificate which he may possess, of his previous work, both undergraduate and graduate, of any papers which he may have written or of original work which he may have pursued.

A PLAN TO INCREASE THE USEFULNESS OF THE DEPARTMENT OF HYGIENE.

In the annual report to the Provost upon the Laboratory of Hygiene for the year ending September 1, 1897, attention was directed to the comparative unpopularity of the course in Practical Hygiene that is given in the Laboratory. Of the one hundred and twenty-four voluntary students (principally graduates of medicine) who have presented themselves for instruction since the opening of the department, only thirty-nine have undertaken the study of practical sanitation; while the remaining eighty-five have desired teaching in bacteriology alone.

The reason for this is not difficult to discover. To the practising physician a knowledge of bacteriology is essential to his intelligent comprehension of the manifold factors that are concerned in the causation, the modes of dissemination and the methods of prevention of contagious diseases. This fact is becoming daily more widely recognized. In short, such knowledge can be utilized with profit by the physician and surgeon in the course of their life work, upon which it has so direct a bearing.

On the other hand, the future usefulness of the general medical man is entirely independent of a special training in practical sanitation. This is a special field of work upon which his success as a practitioner does not in any way depend. In consequence, since he sees no immediate use for such training, and since the opportunities for the practical employment of such knowledge are few, he does not afford the time necessary to acquire it. In short, the demand in this country for the services of specially trained sanitarians is as yet but limited. Indeed, the position of teacher in some one or another of our more advanced schools is about the only opportunity that presents for the profitable utilization of such training, and these positions are few. With the hope of increasing the efficiency of the public health service throughout our State, by creating a demand for the services of men who are properly trained in the methods of sanitary investigation, it was proposed to confer with the executive heads of the more important towns and boroughs in Pennsylvania, in order to determine what might be done to establish something in the way of an organized system of public health laboratories for the solution of problems that are of importance to the people of the State.

To this end the following letter, explanatory of the plan, was addressed by the Provost of the University to the Secretary of the State Board of Health and the mayors,

burgesses, and health officers of a number of communities throughout Pennsylvania :

TO THE HONORABLE
THE MAYOR OF _____,
_____, PENNA.

My dear Sir:—For some time past, the University of Pennsylvania has been considering ways by which the facilities of the University may be opened in larger measure to the State of Pennsylvania. One of these ways is now suggested.

There has been established at the University an important Laboratory of Hygiene, under expert direction and with competent assistants. Our wish is to offer at the Laboratory the services of the University staff, in all questions of sanitation, to local Health authorities. We believe that prolongation of life, mitigation of suffering, and prevention of disease will follow a systematic and scientific co-operation upon this subject.

Our thought is that at every important centre in the State, there should be established a laboratory for sanitary investigation,—these Laboratories to be under the control of the local Health authorities, or the State Board of Health, as may be deemed best; and certainly under the immediate supervision of a Medical Health Officer, who is certified to have received the training in practical methods of Hygiene which will enable him to render to the State or local Boards, important aid in the solution of many of their sanitary problems.

The authorities of the University are entirely willing to offer their Laboratory of Hygiene as the centre of such a system, holding themselves in readiness to afford whatever assistance lies in their power to the State Laboratories, in the event of questions arising in which such help is desirable.

If this suggestion meet with your approval, I shall be glad to take further steps towards the organization of the system. In any event, I shall be glad to have an expression of opinion from you on the subject.

Very respectfully yours,

C. C. HARRISON,

November 18, 1897.

Provost.

The result of this communication has not been as satisfactory as we had hoped. Only eight answers were received to the 160 letters sent out, and of these eight, only two could be regarded as directly favorable to the scheme. We cannot believe from this that there is a disregard on the part of our public officials for the health of the communities they represent: we are more inclined to think that possibly the apparent indifference to our proposal arises

from a lack of definite information as to what is contemplated by this plan. The idea was simply the organization at a number of points throughout the State of laboratories to which many of the problems that confront the local health authorities could be referred. With the present arrangements for the conservation of the public health in the State, the various boards either get no scientific assistance whatever in their work, or when they do get such assistance, it is from laboratories at a distance, to which their problems are of necessity referred. In the course of the work of all such boards, there are constantly arising questions bearing upon the causation, modes of dissemination and modes of prevention of infectious diseases; questions bearing upon disinfection; those relating to the milk, water and food supply; to drainage of the soil, pollution of the air, etc., which can only be intelligently taken up after definite data have been obtained through proper scientific methods of investigation. Were it possible to place at the disposal of our health boards laboratories presided over by properly trained men, many of these questions could be promptly and positively answered. It is our belief that if the citizens of the State can be brought to realize the practical importance of such an organization, there will be but little doubt as to its ultimate perfection.

**UPON CERTAIN ANALOGIES EXISTING BETWEEN THE NUTRITIVE
PROCESSES OF ANIMAL AND VEGETABLE ORGANISMS,
AND THE INFLUENCE OF ENVIRONMENT UPON
THE PHYSIOLOGICAL FUNCTIONS OF
SUCH ORGANISMS.***

By Adelaide Ward Peckham, M. D.

Perhaps the most interesting class of observations that is made by the physician relate to the functions by which the tissues of the human body are constructed and main-

* Read before the Biological Club of the University of Pennsylvania, on March 7, 1898.

tained; and his efforts in the domain of medicine give him no greater pleasure than that of watching, from day to day, effects which show a renewed power for appropriating the food substances by which the body is able to replace its wasted tissues.

In studying the biology of the lower forms of both animal and plant life, it is also extremely interesting to note the processes by which the vital activities are maintained. In the minute, unicellular, vegetable structures, the micro-organisms, one is surprised to find that these microscopic cells can carry on processes resembling very closely those found in the highest forms of life, and which, even in them, are considered very complex. The functions of nutrition show certain analogies in all living organisms, bringing all forms of life into a beautiful harmony, each with the other, and all with the provisions of nature.

I have chosen some of the analogous processes found in the metabolism of a few different organisms for consideration this evening.

Metabolism includes all of the chemical changes that occur in living tissues. The process is divided into four steps: (1) The ingestion of food. (2) The digestion of food; and this includes the physical and chemical changes by which food is made soluble and ready to pass by diffusion or filtration into the fluid. (3) Absorption, or the drawing of the food material into the fluid channels. (4) Assimilation, or the selection and appropriation of substances brought to the tissues by the fluid element of the organism.

All organisms use the same proximate principles of food—the organic and the inorganic. The organic foods are the carbohydrates, the proteids and the fats. Of these three classes, we will first consider the carbohydrates.

In the human economy, as you well know, the rôle of the carbohydrates is that of a respiratory food, and their products afford the dynamic sustenance of the body. A

brief description of the metabolism of the carbohydrates in the human body must be given, however, for the purpose of comparison.

The elements of all of the food materials become more or less rearranged before they are suitable for becoming constituents of the cell tissues. The sugars and starches forming the carbohydrate group are absorbed from the alimentary canal of man in one form, namely, as glucose. All of the other carbohydrate substances must be changed to glucose before absorption can take place, and this change is brought about in the following manner: The starches are subjected to a ferment in the saliva by which they undergo a process of hydration, and by the addition of a molecule of water they are then changed to glucose. The sugars are usually ingested in the form of a saccharose. A second ferment or enzym inverts the saccharose to glucose by the same process of hydration. A third diastatic ferment in the pancreatic juice completes this process. The glucose is then absorbed through the walls of the blood-vessels and carried by the blood to the liver, where a reserve store of carbohydrate material is laid up in the form of glycogen, and to the different tissues of the body.

The tissue cells are continually in a state of activity, either adding material to their own structure or forming substances which are used for carrying on the processes of nutrition. In consequence of this activity, destructive changes take place in the cells which are of the nature of oxidation or combustion; the oxygen brought to the tissue by the blood, enters the molecules, either uniting directly with the reduced carbon of the cell, or with more complex bodies, the less reduced products of excretion, and again appears in the blood in these oxidized products.

Oxidation does not occur in the food in the alimentary canal, nor in the blood which carries the food to the tissues. It is after its assimilation, that is, after it has become a part of the living cell, that it becomes waste product

through metabolism of the tissue, is oxidized and gives rise to heat and motion. The carbonic acid thus produced in the tissue cells is then carried by the blood stream to the lungs, where an interchange of gases takes place, the carbonic acid being exchanged for the oxygen of the air. By this process of metabolism, heat, activity and gaseous respiration are generated.

From the highest form of life we will pass to the lowest, and note the metabolic changes of the carbohydrates in the micro-organisms. As in the higher organisms, the sugars give new energy for new activities. But while in the more complex bodies groups of cells are set apart for the performance of each function, in the single cell all function must be instituted by itself.

Bacteria are divided into two classes which are distinguished by their attitude toward the free oxygen of the air. One class thrives when in contact with air; the other finds oxygen a poison which quickly destroys the cell. Both classes are, however, dependent upon the oxygen in combination in the substances used as nutritive materials.

The breaking up of sugar by bacteria for the purpose of obtaining oxygen was first noted by Pasteur in his great work upon fermentation; and his observation will illustrate the action of both classes of bacteria upon the sugars. The starches have been but little studied in connection with bacteria.

Now, Pasteur observed that the yeast cell, an organism belonging to the aerobic or air-loving class, when introduced into a sugar solution freely supplied with air, produced large amounts of carbonic acid, with almost entire absence of alcohol. Alcohol, as you know, is formed by the splitting of one molecule of glucose into two molecules of alcohol and two of carbonic acid. This product is freely formed in yeast fermentation.

But when the yeast cell was placed in a sugar solution deprived for the most part of air, the cells reduced the

sugar to such an extent that large amounts of alcohol and carbonic acid were formed. In this last instance the yeast cell, being deprived of free oxygen, was compelled to obtain it from the nutritive medium.

In this manner the anaerobes are always obliged to obtain oxygen. The greater number of this class thrive best in an atmosphere of hydrogen and cannot live in an atmosphere of carbonic acid. For this reason the oxygen necessary for combustion must be obtained either from the carbohydrates or by special chemical action upon inorganic salts.

After observing this fermentative action for obtaining oxygen, Pasteur defined fermentation as life without air.

In the making of beer, yeast fermentation is never allowed to run its full course. The extent of the action is known by the density of the wort, which diminishes as fermentation proceeds. In distilling spirits from grain, however, the fermentation is pushed as far as possible by adding repeated doses of fresh yeast, and much more alcohol is obtained by this process.

At this point let us compare metabolism in the tissue cell, with the same process in micro-organisms.

1. The carbohydrates are the first substances selected for digestion in the alimentary canal. Fermentation of the carbohydrates is also the first process of digestion in the bacterial cell.

2. All carbohydrates must, through the action of a ferment, undergo the process of hydration with the formation of glucose, before they can be absorbed into the fluids of the body. In the bacterial cell the inversion of the different sugars to glucose is also necessary before further action can take place.

3. The final disposition of the carbohydrate elements in the tissue cells differs from their oxidation in the bacterial cell in the following manner:

The elements of glucose and also of the lactic acid into which it is split in the muscle, are so proportioned that

the amount of oxygen is exactly enough to combine with the hydrogen present in the molecule to form carbonic acid. Glucose ($C_6H_{12}O_6$) splits into two molecules of lactic acid ($2C_3H_6O$) and this further into $6H_2O$ and $6C$. Enough oxygen for combination with the carbon is then required, and this is obtained from the oxygen of the air which is carried to the cells by the blood.

I have shown that the yeast cell when cultivated with free access to air obtains from it enough oxygen to oxidize the carbon, and carbonic acid and water are formed as in the tissue cell.

In true fermentation, however, where the breaking up of the carbohydrates is the principal source of the oxygen, the carbon becomes oxidized and the hydrogen remains free. In this case the products of fermentation are lactic and, perhaps, other acids, carbonic acid and free hydrogen. This experiment can be very easily made by growing a fermenting organism in the ordinary armed fermenting tube, in which the access of air is very limited. The carbonic acid can be easily separated in the form of an alkaline carbonate and the remaining gas tested by ignition.

4. Finally, the carbohydrates are the sources of heat and motion in both the tissue and the bacterial cell. The changes necessary for the performance of this function take place in the living cell. The process of fermentation is a compensation for the absence of free oxygen. By this process anaerobic organisms, which live in an atmosphere of hydrogen, undergo combustion with the production of carbonic acid.

Another analogue of the metabolism of the carbohydrates in the human body is found in solar combustion, or the action of the sun's rays upon sugar-holding bodies. Duclaux, in 1893, exposed sterile sugar solutions to the sun's rays. A process similar to microbial fermentation was established. These results varied when different varieties of sugar and different alkalies were used. He

found that the analogy between solar combustion and microbic fermentation is noticeable not only when the phenomena have terminated, but also at the beginning of the process. For instance, saccharose, which cannot be absorbed by either the tissue or the bacterial cell until it has been inverted, resists also solar combustion. Again, the products of solar action are the same as those found in the fermentative processes described; namely, lactic acids of different rotatory powers, alcohol, carbonic acid, etc. The carbonates of the dextro- and laevo-gyrate acids were also unequally combustible as found by Péré in microbic fermentation. The sun, therefore, provides an action allied to fermentation which assists in the processes of metabolism.

In green plant life, the food substances taken in by the root and leaves undergo processes which differ from those which we have described in animal and bacterial life. Constructive metabolism is a prominent characteristic of green plants, and by this synthetic process substances are formed and stored in the plant which are appropriated for food by animals. This elaboration of these complex bodies, the changing of the inorganic to organic substances, is effected by an energy derived from the solar rays by chlorophyl, and must take place in daylight. Their subsequent use, however, may take place in darkness, and the greatest growth in plants actually occurs at night.

But green plants deprived of light, and colorless plants, undergo destructive metabolism of the substances stored up in themselves by a process resembling that found in the animal cell.

Ripening fruits, when deprived of the oxygen of the air, also undergo a process similar to fermentation. They break up their sugar to obtain oxygen, give off carbonic acid, and at the same time become more acid to the taste.

The second and most important class of the organic foods, the proteids, also show analogies in metabolism between animal tissues and micro-organisms.

The preparation of albuminous substances for diffusion through the intestinal wall, as in the carbohydrates, is due to a process of fermentation resulting in hydration. The proteolytic enzymes are two in number:

First, pepsin, which is most active in an acid solution; and, secondly, trypsin, which is most active in an alkaline solution. By these ferments, the proteids are converted into hydrated substances called peptones, tryptones and albumoses, in which form they pass into the intestinal walls. There they are supposed to be transformed into proteids similar to those originally ingested. They then enter the blood-vessels and are carried to the various tissues of the body. In the tissues, the proteids form the plastic material of the cell. They then undergo destructive metabolism by oxidation, with the formation of many complex partially oxidized bodies, and of carbonic acid and water, as final products.

The proteolytic function in the bacterial cell is carried on as follows: In common with the tissue cell, it produces an enzyme for the hydration of the proteids. In some instances, as in the bacillus prodigiosus, the enzyme, like pepsin, shows greater activity in an acid solution; but in most instances an alkaline reaction is required, which indicates that the enzyme resembles trypsin. According to Fermi and Pampersi, these enzymes transform the proteids into substances more of the nature of albumoses than of peptones. They also undergo changes like those that take place in the intestinal wall.

The rôle played by the proteids in the bacterial cell is also that of plastic material, and it constitutes its framework. These albuminous substances are also found in the cell juices, where they act as carriers of gases, and as material for growth and division. The products of their

destruction by oxidation consist of complex bodies which are only partially oxidized, carbonic acid, and water.

The proteolytic function, therefore, as found in the micro-organism, is almost exactly similar to that found in the alimentary canal. Some difference exists in the products of destructive metabolism.

While noting the process of carbohydrate fermentation, the attention is continually drawn to the influence of the presence or absence of free oxygen upon the processes carried on in the bacterial cell; and one is led to wonder whether the anaerobic organisms were not originally aerobes which, by being gradually deprived of air, have become able finally to depend on combined oxygen alone.

The influence of environment on the functions of higher forms of life has been much studied, and botanists believe that plants have been gradually changing through all time and have finally become more or less widely separated. Many instances might be cited where both animals and plants have been found to adapt themselves to some peculiarity of environment. As in these higher forms of life, the struggle for existence under changed conditions of nutrition, results in variation in the modes of life of the unicellular organisms. These changes may be included under three heads:

1. A withdrawal of an environmental factor, the energy conserved from one function being used for another.
2. A lack of nutritive material may induce a lessening of all the vital activities.
3. Under conditions most favorable regarding the quantity and quality of the nutritive material some inhibiting influence may arise which is so detrimental to the welfare of the cell that changes in function occur which may result in death.

Under the first head, in which a disturbance of the equilibrium of the functions is due to excess of a special food factor, we will cite a few cases.

The function of fermentation may be made to vary considerably aside from the conditions relating to the supply of air which we have already discussed. With organisms in which this is the characteristic function, growth in a medium affording equal amounts of both carbohydrates and proteids, may result in excessive fermentation, with the production of enough acid to finally inhibit all growth. During this process, so much energy has been used that action upon the proteids is almost entirely absent, and the cell-structure, therefore, suffers from lack of plastic material.

On the other hand, the proteolytic function may be made the most prominent by an almost entire absence of the carbohydrates in the nutritive medium. In this instance, conservation of the force that would have been used in fermentation admits of increased proteolytic activity, which, in pathogenic organisms, may result in the production of complex, poisonous, nitrogenous bodies.

Recent studies upon the effect of the carbohydrates upon some varieties of pathogenic bacteria have shown, that, if they are cultivated upon a medium containing glucose, their virulence is considerably diminished. Energy that might have been used for forming toxins has been lost in the process of fermentation.

Another instance of perverted function is found in the chromogenic bacteria. These organisms contain brilliant pigments, which, under certain conditions, completely disappear. Pigment formation in these organisms takes place only in the presence of free oxygen. The pigments appear in many instances to be oxygen carriers, receiving this element from the air and carrying it to the cell. Whenever cultures of this class are deprived of free oxygen, the pigment does not appear; but usually, like the Tyrian purple, which is colorless when obtained, the cultures are easily transformed to chromogens by the presence of air. It naturally follows that most of the anaerobic

micro-organisms are colorless. In this instance, the cultures are deprived of free oxygen and the force that would have been generated for pigment formation is used in obtaining the necessary amount of combined oxygen.

In the second case, there is a diminution of all the vital activities from lack of nutrition. This results in a loss of equilibrium between waste and repair with gradual diminution of all the functions, the needs of the organism being adapted to the food supply. When this process is carried on for a sufficient time, a permanent loss of functional force may occur; but in the comparatively limited time that is used in laboratory experiments, the cultures usually regain their normal activity of function soon after they are placed in a proper nutritive medium.

Under the changes of adaptation may be included the growing of cultures for long periods without change of the nutritive medium. Here two inhibiting factors are found: First, the lack of nutritive material; secondly, the acidity or alkalinity of the medium, which is due to the products of metabolism, the acids and the nitrogenous bodies from reduced substances.

Sanfelice observed that permanent changes in cell function could be produced in the proteus, the subtilis, indicus, anthrax, cholera and the staphylococcus pyogenes by growth under anaerobic conditions. These cultures when again cultivated in air were not able to liquefy gelatine.

Some of the pathogenic organisms become attenuated by leading a saprophytic existence for a long period. The cholera vibrio, after remaining for a long time in spring water, showed two varieties distinguished morphologically, one having short and plump, the other long and slim commas.

A natural variation in function is repeatedly observed in freshly isolated cultures of the same organism. These variations are probably due to the changes of adaptation. Krause and Pansini found slight variations in regard to

the morphological, physiological and pathological properties of eighty-four freshly isolated cultures of the pneumococcus; but when these cultures were placed under exactly similar conditions these differences were for the most part abolished.

The type held by the pathogenic organisms is not exactly unchangeable. Increase or decrease in pathogenic power is often observed in cultures of the cholera vibrio obtained in different epidemics. Pathogenesis is the least constant characteristic of micro-organisms, because it depends upon the proteolytic function which is the function most easily affected by both adaptive and degenerative changes.

Finally, there are groups of organisms which so closely resemble each other that it is almost impossible to find means for their differentiation. Some nutrimental influence may have caused these deviations in function, for the morphological variations are often scarcely observable. The discovery of the serum reaction, by Pfeiffer, has somewhat lessened this difficulty in the pathogenic bacteria.

The third condition, namely, the inhibition of cell activity under conditions favorable as far as the food supply is concerned, is a subject that deserves special attention.

Substances that are either detrimental to cell growth, or directly destructive to it, may be used in small quantities in the nutritive media, and cause more or less permanent changes, which are degenerative in character.

Cultivation at a high temperature has been found to affect the vital activities of some micro-organisms. Each organism seems to have a certain temperature range, but this can often be extended and a tolerance acquired for even extremes of heat and cold.

Pasteur found that anthrax when cultivated at a temperature of 42-43° C. for eight days loses its ability to form spores. And a similar result has been shown to follow the treatment of this organism with particular chemical reagents.

The action of various antiseptics upon micro-organisms has been much studied.

The bacillus pyocyanus and the bacillus prodigiosus are changed morphologically, the rods becoming much longer and irregular in size when they are cultivated in a medium containing antiseptics. These changes are permanent if growth is carried on for some time.

Villinger found that the colon bacillus becomes permanently non-motile when grown in a medium containing carbolic acid and kept at a temperature of 42° C.

The interesting observation was made by Schottelius and Wasserzug, that the bacillus prodigiosus is only motile when grown in a slightly acid medium. This is probably due to the fact that the proteolytic ferment, like pepsin, is active in the presence of acids, and the plastic material necessary for the formation of the organs of motion, the flagella, is not furnished under other conditions.

The attenuation of pathogenic organisms has been a subject of great interest ever since Pasteur demonstrated the fact that immunity against certain diseases is afforded by inoculation with the attenuated micro-organism causing the disease. Methods of attenuating cultures for the purposes of protective inoculation have been earnestly devised. The study of immunity turned attention to the action of the cells and fluids of the body in bringing about the destruction of micro-organisms.

Brieger, Kitasato and Wasserman found that the tetanus bacillus, when grown in a bouillon made from the thymus gland of the calf cannot form spores, and later they attenuated several other organisms in the same manner.

Petruschky and Behring found that an attenuation of the anthrax bacillus takes place when it is inoculated into the body of a non-susceptible animal. On the contrary, growth in a susceptible animal increases the pathogenic power. The germicidal properties of fresh blood were demonstrated by Nutall and later Buchner and Hankin

proved that this property is found in the proteid substances of the blood serum.

This inhibition of the vital activities of the pathogenic micro-organisms, which is called an attenuation of pathogenic power, seems to be induced by disturbance of the proteolytic function which prevents the formation of the toxic proteids which are the source of virulence.

Before closing, a word must be said upon the transmission of traits acquired by micro-organisms under the influence of the varied conditions of environment. In the cell the question of inheritance refers wholly to the maintenance of life. Incapacity in any degree, whether of digestion or motion, renders the cell less able to secure and assimilate food. In conditions affording little nourishment, less functional power is developed and less is required. The cell finally adjusts its needs to its environment and it then enters a transitional stage. The characters of the cell usually appear in the descendants, the daughter cell sharing in the deficiencies of the parent.

NOTES.**Astronomy and Mathematics.**

The equatorial telescope has been devoted almost wholly during the past year to the measurement of double star systems. More than nine hundred observations have been made, involving about thirty-six hundred single measures of distance and position angle. The total number of systems measured is thus far two hundred and ten. The various errors of position and flexure of the instrument were determined three times, and the value of the micrometer screw was determined five times.

Observations for variation of latitude have been kept up continuously at the Observatory since October 1, 1896. About twenty-five hundred separate determinations have been made, and the reduction is well in hand.

By invitation of the teachers of the Mathematical Department of the Girls' High School, Professors Fisher and Schwatt delivered two lectures on the "Extension of Number in Algebra." The lectures were devoted particularly to the theory of irrational and imaginary numbers.

Professors Fisher and Schwatt have their "Text-Book of Algebra," upon which they have been working for the past two years, ready for the press. The book will be a radical departure from existing text-books. The aim of the authors has been to lay the foundations rigorously and yet with sufficient simplicity for beginners in the subject. The book will be published about June 1.

English Literature.

Mr. Arthur Hobson Quinn, Instructor in English, who has recently been studying at Munich on leave of absence, chiefly with Professor Schick, has been unexpectedly called home, and will continue his studies at the University. He has in hand a reprint and critical study of the Elizabethan play, *The Fair Maid of Bristoe*, a transcript of which he has recently made from the copy in the British Museum.

A holograph of some of the poems of Thomas Flatman, bearing date 1661, and showing variants of interest, has been added recently to the Library. It is to form the subject of a paper by Professor Felix E. Schelling.

Mr. Raymond Macdonald Alden, George Leib Harrison Fellow in English, is bringing to conclusion his study of *The Rise of Formal Satire in England under Classical Influence*.

Miss Emma Fraser, holder of the Frances Sergeant Pepper Fellowship (in English), has nearly completed an investigation of the dramatic career of Thomas Lodge.

Mr. M. Schütze, George Leib Harrison Fellow in Germanic Languages, has presented, in a paper read before the English Seminary, some important conclusions based upon a comparison of Dr. Flügel's reprint of the original MS. of the poetry of Sir Thomas Wyatt, with the received version of Tottel's *Miscellany*.

Archæology and Paleontology.

A series of lectures, actual demonstrations in the Museum with the aid of its collections, have been delivered on Wednesday afternoons in the American Hall as follows:

January 5, Mr. Frank H. Cushing, "Gorgets, Bird- and Banner-Stones," Pipes and Calumets.

January 12, Dr. Daniel G. Brinton, "How to Study Stone Implements."

January 19, Dr. Max Uhle, "The Peruvian Mumify."

January 26, Mr. Stewart Culin, "Lights and Lighting."

February 2, Dr. Daniel G. Brinton, "Primitive Uses of Bone."

February 9, Professor Amos P. Brown, "Jade and Green Stones in Asia and America."

February 16, Mr. Stewart Culin, "Charms and Amulets."

February 23, Dr. John W. Harshberger, "The Use of Plants Among the Ancient Peruvians."

March 2, Mrs. Talcott Williams, "Tatooing in Morocco."

March 9, Dr. Daniel G. Brinton, "European Archæology."

March 16, Mr. Stewart Culin, "Engraved Powder Horns."

March 23, Mr. A. E. Outerbridge, Jr., "Curiosities of American Coinage."

March 30, Dr. Max Uhle, "Coca and Tobacco in South America."

April 6, Mr. Stewart Culin, "Fraudulent and Counterfeit Antiquities."

April 13, Mr. H. Kent Day, "Monumental Brasses."

The staff and assistants of the Museum are now engaged in preparing and cataloguing the collections made by Dr. Max Uhle in Peru, and Mr. F. H. Cushing in Florida. A number of important special collections: American history, fans, fire-making and lighting, numismatics, etc., have been undertaken. A special exhibition of fire-making and lighting apparatus is in preparation which will be displayed in the spring.

Constant additions are being made to the Museum collections, both of specimens and related literature, of which a complete list with notes and illustrations is published in the *Bulletin of the Free Museum of Science and Art*.

History.

Recent additions to the historical collections in the Library include: Bouquet, *Scriptores rerum Gallicarum et Francicarum*; a working library on Wiclif, including all publications of the Wiclif Society, all contemporary chroniclers in the Rolls Series, etc.; a working library on Feudalism, including Teulet, *Layettes du Trésor des Chartes*; Rozière, *Formules usitées dans l'Empire des Francs*, etc.

Below is given a synopsis of the new courses, offered during the present year, in American Constitutional History, by Dr. H. V. Ames. The numbers prefixed to each course are University Catalogue indices.

7. American Colonial History, Political and Institutional.

This course aims to give a general survey of the period, but emphasizes especially the institutional development of the colonies, with the view of tracing the genesis of the United States. It opens with a preliminary consideration of the following topics:—The physical geography of North America and its relation with history; the antiquity of man in America and the native races; the general causes opening the Western Hemisphere to Europe, and the gradual unfolding of the American continent to European knowledge; the rival claims of European nations to territory, and their colonial policies. The main work of the course, however, is devoted to the study of the English Colonies in North America; the transplanting of Englishmen and English institutions, and the development of English institutions into American institutions. While the general movements in all the English Colonies are studied, both in their internal and external relations, more detailed consideration is given to the political and institutional life in a typical northern, middle and southern colony. The struggles with France for supremacy in the series of Colonial Wars, and the resulting influence upon the colonies are discussed. The growth of the colonies toward union and independence is traced through the successive stages of the controversy with England in regard to the constitutional relationship existing between the colonies and the mother country, beginning with the struggle for the rights of Englishmen, and ending with the struggle for

the rights of man, as set forth in the Declaration of Independence. The course closes with a review of the Revolutionary War, and the results of the Peace of 1783.

The work of the course is conducted by means of lectures, recitations from a text-book and collateral readings from standard histories and contemporary writers. Each member of the class is also required to draw a set of maps illustrating colonial geography. The class is supplied with an outline of the lectures, and lantern slides presenting different phases of the life of the colonists are shown from time to time. This course is prescribed for Freshmen in Arts and Sciences, and Science and Technology.

**8. American Institutional and Constitutional History during
the Colonial and Revolutionary periods.**

This course begins with a study of the political heritage of the colonists, with a view of tracing and estimating the influence of European and American experience upon the development of American institutions. A systematic study of the origin and administration of the charters and of the structure of the different types of colonial governments follows. The rise of the representative and bicameral systems is traced with considerable detail. The origin and different types of local government, together with the influence of physical and economic features upon political institutions is emphasized. The chief features of colonial legislation are examined. The relations existing between Church and State and the appearance of religious toleration are noted. The growth of the "continental idea" and the germ of the federal system is next considered. The difficulties and advantages of union, with the various plans of union, 1643-1776, are studied. The constitutional questions, which arose in connection with the controversy between the English Colonies and the mother country, are examined. Under this head the following are some of the topics considered: England's commercial policy; English and Colonial theories as to the relation of the colonies to the home government; a comparison of the English and American representative systems, and their different conception of the meaning of representation; the struggle for the rights of Englishmen;

the struggle for the rights of man; origin and growth of independence; the source of the political philosophy in the Declaration of Independence.

Constitutional questions of the Revolutionary period are next examined, as follows: The transition from Colonial to State government; the revolutionary bills of rights; the origin, analysis and administration of the early State constitutions; the Continental Congress, the nature of its work, and its relation to the States.

The Period of the Confederation is next studied. The following are the chief topics considered: Causes that delayed the formation of the Confederation; analysis and history of the Articles of Confederation; State sovereignty as the basis of union; defects of articles; the administration of the government and its relation with the States; the decline of the Confederation, and the attempts to secure a more satisfactory basis of union.

The work of the course is conducted by means of lectures, special reports and discussions, involving a critical examination of both general authorities and also of such original material as charters and constitutions, the more important State papers, the journals of Congress and of the State legislatures, judicial decisions and acts of legislation.

This course is prescribed for Juniors in the History-Economics group, but is open to others as an elective.

g. Constitutional History of the United States.

This course opens with a preliminary survey of the structure of Colonial Governments and the development of American institutions during the Colonial and Revolutionary periods. Then follows a detailed study of the formation and ratification of the Federal Constitution, and of the great constitutional questions which have arisen in connection with the administration and interpretation of the Constitution during the following periods:

1. The Growth of Nationality; 1789-1815: Contest between Nationality and State Sovereignty. Questions of the interpretation of the Constitution in regard to the powers of the Federal Government and the reserve powers of the States, in

connection with the organization and administration of the government; broad and strict construction; remedy for usurpation; jurisdiction of the courts; final arbiter between Federal and State Governments; the first twelve amendments and unsuccessful amendments.

2. The Nationalization of Democracy, and the conflict between Nationality and Slavery, 1815-1860. The nationalizing results of the War of 1812; jurisdiction of the Federal Judiciary asserted; constitutionality of internal improvements, tariff, a national bank, the removal of the deposits, the distribution of the surplus; nullification, the theory and practice; the "Missouri Compromise;" incendiary publications in the mails; the right of petition; annexation of territory; slavery in the territories, restriction *versus* extension; proposed amendments to the Constitution.

3. Civil War and Reconstruction, 1860-1876, the triumph of Nationality. Secession, theory and practice; the Government of the United States during the Civil War; the nature and extent of the war power; emancipation and the status of the negro; the theories and actual process of reconstruction; the thirteenth, fourteenth and fifteenth amendments and their interpretation; other proposed amendments; constitutional results of the war.

The methods of the course are the same as in course 8. This course is prescribed for Seniors in the History-Economics group, but is open to others as an elective.

Finance and Economy.

At the joint meeting of the American Economic Association and the American Historical Association, held at Cleveland, December 29-31, 1897, Professor H. R. Seager led the economists in a discussion of "The Relation Between the Teaching of Economic History and Political Economy." An abstract of his address has just appeared in the Handbook of the American Economic Association for 1898, pp. 92-95. Professor Seager's address on the Consumers' League, delivered before the American Academy of Political and Social Science in Philadelphia, on January 26, was published in the March Bulletin of that organization.

Toward the close of the first term, Dr. James T. Young was forced to abandon his work for a time on account of illness. His undergraduate hours in the course in Finance and Economy were partly assumed by Dr. H. V. Ames, Instructor in American Constitutional History, and partly distributed among Professors Adams, Falkner and Lindsay.

The illness of Dr. W. D. Lewis, Dean of the Law School, also caused a break in the course, and the lectures upon the History of Private Law and Legal Concepts, which are prescribed for Seniors in this course, were omitted. The hours have been filled by Professor Frederic W. Spiers, Ph. D., of the Drexel Institute, who accepted an invitation to give a course of lectures upon the History of the Labor Movement.

Professor S. M. Lindsay has recently completed a series of five lectures on the "Elements of Scientific Philanthropy," before a class from the Social Science Section of the Civic Club. These lectures were given on successive Saturday afternoons, beginning January 29, at the house of Mrs. Edward Longstreth, 1805 Spring Garden street, and the topics treated were : (1) Recent Tendencies in Scientific Philanthropy; (2) Administrative Problems in Public Charity; (3) Psychological Characteristics of the Social Debtor Classes; (4) Economics of Charity; (5) Social Evolution and Charity. The class, composed of women, many of whom are actively identified with the management of local charities, has been furnished with an outline syllabus of the course containing ample bibliographies and suggestions for further study.

One of the new publications of the University illustrates the growing nearness of the University to the world of practical affairs. It is No. 13 of the series in Political Economy and Public Law, and is entitled "A Discussion of the Interrogatories of the Monetary Commission of the Indianapolis Convention." It was written in October at the suggestion of the Provost, who had received from the Commission a circular of interrogatories with regard to the merits of various proposals for the reform of the currency. The "interrogatories" were referred by the Provost to the Committee on Finance and Economy and were considered by four members of that committee, Professors J. F. Johnson, R. P. Falkner, H. R. Seager

and S. M. Lindsay. The thirty-eight questions propounded by the Commission are first answered by Professor J. F. Johnson in the order of presentation. In his opinion the most important reform needed at the present time is in the banking system. If our bank currency were elastic, its contraction and expansion would be an automatic corrective of some of the present evils of our monetary system; the necessity for gold imports and exports would be lessened and the strain upon the national treasury would be diminished. With Congress in its present temper he regards as unwise any attempt to retire the greenbacks, and advises that they be issued exclusively in denominations under \$10, in order that they may be constantly in use among the people and not be available for the withdrawal of gold from the treasury. In order to secure an elastic bank currency he recommends that the privilege of issuing notes, which should not be legal tender and should not bear the government's guarantee, be restricted to banks of large capital, which should be allowed to establish branches.

AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE.

The American Academy of Political and Social Science is an organization of about two thousand members scattered throughout the United States, and with a goodly representation in Europe. It has been closely affiliated with the University for the twofold reason that by its charter its headquarters is in Philadelphia, and that several of its officers and active members of the Council are connected with the faculty of the University.

During the past winter four meetings have been held: three of them in the New Century Drawing Room, 124 South Twelfth street, and one in the Assembly Room of the Philadelphia Bourse. At the first meeting in November, Dr. W. E. Burghardt DuBois, who was at that time Assistant in Sociology at the University of Pennsylvania, and is now Assistant Professor of History and Economics at the University of Atlanta, presented the leading paper on "Problems of the American Negro." The Provost of the University presided at this meeting, and in his introductory remarks called attention to the work that Dr. DuBois had done under the direction of the Assistant Professor of Sociology at the University, in investi-

gating the condition of the negroes in the Seventh Ward of the city of Philadelphia. Over ten thousand individuals were scheduled, and very complete data relating to their economic activities and their social life have been collated and will be published shortly by the University. Among others, Professor John Bach McMaster took part in the discussion following this paper, and called attention to the historical development of some of the leading questions affecting the American negro.

At the December meeting, on the subject of "The Economic Relation of Life Insurance to Society and State," Professor Samuel McCune Lindsay presided, and in his opening remarks called attention to the social significance of the insurance principle in its various applications as indicative of a feeling of social solidarity and of a recognition of the significance of mutual interests in modern life. Professor Roland P. Falkner took part in the discussion following the main paper by Mr. L. G. Fouse, and spoke on insurance as an important factor in modern life, referring especially to the benefits that it brings to society as contrasted with those which the individual reaps. At the January meeting of the Consumers' League, at which Professor Lindsay again presided, Professor H. R. Seager in the course of the discussion presented a criticism of the plan of the Consumers' League as viewed from the point of view of theoretical economics. Finally, at the meeting in February, devoted to a discussion of the "Recent Propositions in Congress for Currency Reform," Professor Joseph French Johnson of the University was the chief speaker, and presented the substance of a critical paper dealing with the plan of the Secretary of the Treasury, and with that of the Monetary Commission. A full text of this paper appears in the *Annals* of the Academy for March, 1898.

ABSTRACTS OF RECENT PAPERS.

Derivation and Properties of Rational Polygons.

ISAAC J. SCHWATT.

[Abstract of paper read before Mathematical Club, January 14, 1898.]

The properties of rational triangles are especially discussed. Principles are established by which we are enabled to decide which of the regular polygons are rational. It is found, for instance, that an equilateral

triangle and a regular hexagon cannot be rational. Just as all the properties of right triangles can be derived from the properties of oblique triangles, by introducing the condition of the Pythagorean theorem, or in dealing with trigonometrical formulæ by assuming 90° for one of the angles, so the properties of rational triangles can be derived from the properties of irrational triangles by assuming that either $4R \cos^2 \frac{1}{2} - A \cos^2 \frac{1}{2} B$ is equal to 1, or is equal to the h. c. m. of the assumed parameters of the triangle.

Descartes' Geometry.

EDWIN S. CRAWLEY.

[Abstract of paper read before Mathematical Club, February 11, 1898.]

The object of the paper was to give some idea of the general plan of this great work and a view of its contents. The writer expressed the opinion that Descartes' conception of expressing a geometrical locus by its equation came to him in studying the problem of Pappus, only incompletely solved by the Greeks. "Having given n right lines in a plane to determine the locus of the intersection of an equal number of other lines making given angles with the given lines, and having some fixed relation as to magnitude among themselves."

An Optical Method of Registering Alternating Currents.

J. A. SWITZER.

[Abstract of paper read before the Mathematical Club, March 11, 1898.]

The method of registering alternating currents was suggested by Dr. A. C. Crehore, of Dartmouth College, but as Dr. Crehore stated, he had obtained only the crudest of first results, and so his investigation seemed to leave it an open question whether or not the method could become of practical value.

The writer of the paper proposed, if possible, to investigate the method with a view to answering the question. His work was conducted in the physical laboratory of Cornell University.

The method utilizes the property possessed by carbon disulphide, of rotating the plane of polarization of polarized light when the carbon disulphide is in a magnetic field and the ray of light passes through it in the direction of the lines of force. Since the amount of rotation is a function of the wave-length, if the beam be of polychromatic light the rotation will result in an angular separation between the different wave lengths, so that if a Nicol prism be placed in the beam beyond the tube of carbon disulphide there will in general be some wave-lengths crossed with the prism, while the rest will be transmitted. Hence, if the light be further dispersed into a spectrum, certain wave-lengths will be absent from it, or there will exist a dark band in the spectrum. Since also the

amount of rotation is a function of the magnetic potential difference any change in this will produce a motion of the band in the spectrum. If the magnetic field be produced by an alternating current flowing through a coil of wire surrounding the tube of carbon disulphide, then the changes in the current strength will produce motions of the band which will be synchronous with the alternations.

An important part of the apparatus is a quartz plate, placed in the path of the light. The rotation by the quartz is superimposed upon that by the carbon disulphide. The purpose of this is twofold: first, if it were absent the band would disappear entirely as the current value passed through zero, and hence no continuous record would be possible; second, by properly proportioning its thickness to the number of ampere-turns of current used the width of the band in proportion to its amplitude of motion in the spectrum can be fixed—at least within certain limits—a consideration of vital importance. The method of investigating this relation cannot well be abridged and be made clear in this abstract.

The optical arrangements in the experiment were as follows: A beam of sunlight reflected from a heliostat traversed successively a polarizer (Nicol prism), the tube of carbon disulphide (which was 152 cm. long and was surrounded by the coil of 3840 turns of No. 12 wire), the quartz plate (20 mm. thick), the analyzer (another Nicol prism), and finally the photographing spectroscope. This last consisted of a collimator tube, a triangular prism, a photographic lens and a photographic plate, upon which the spectrum was focused, and which fell vertically, behind a narrow horizontal slit, across the spectrum. Thus a curve was traced upon the plate, the resultant of the motion of the plate and that of the dark band in the spectrum, and which therefore was a faithful representation of the current changes taking place in the coil.

A number of curves were shown with the aid of the lantern. These curves, it is believed, are as good as the method is susceptible of giving, and while they are of scientific value, it is held that the investigation fully answered the question whether or not the method could become of practical value, and answered it in the negative.

Some Compound Harmonic Curves.

HORACE CLARK RICHARDS.

[Abstract of paper read before Mathematical Club, March 11, 1898.]

The paper treated of curves formed by compounding two simple harmonic motions at an angle with each other, such as may be expressed by the equations

$$\begin{aligned}x &= a \cos m \omega t. \\y &= b \cos (n \omega t - \varepsilon).\end{aligned}$$

The symmetrical and other properties of the curves were deduced, and the various methods of describing them briefly considered. The paper was illustrated by a series of curves drawn by means of the Tisley harmonograph in the physical laboratory of the University.

The Measure of the Bluntness of Hypersolid Angles.

PAUL R. HEYL.

[Abstract of paper read before Mathematical Club, February 11, 1893.]

The bluntness of a figure is the measure of the angle at its corner; of the plane angle if the figure be plane, of the solid angle if the figure be solid. To measure a 4-fold angle we take the vertex of the angle as a centre and describe a unit 4-fold sphere. The solid sides of the angle will cut out a curved solid from the solid boundary of the 4-fold sphere, and the volume of this curved solid is the measure of the 4-fold angle.

Of the six regular 4-fold figures the bluntnesses of three are known from geometry, namely, 1.234 for the 8-hedroid, 2.468 for the 24-hedroid, and 0.8225 for the 16-hedroid; complete bluntness being $\pi^2 = 9.8696$, one-half the total solid boundary of a unit 4-fold sphere. The traces of the corners of the remaining three figures are either regular curved tetrahedra, or can be split up into a number of isosceles curved tetrahedra, with regular bases. Since the regular curved tetrahedron is a special case of this latter kind, we have to find a formula for it as the more general case.

The required formula is obtained by integrating throughout the volume of the curved tetrahedron in 4-fold polar co-ordinates. The formula is at first a triple integral, which is reduced to a single integral. Further reduction is impracticable, and the numerical value is obtained by the method of the mean ordinate. As a check upon the accuracy of this formula it gives, working to four figures, the bluntness of the 8-hedroid as something between 1.232 and 1.237; the actual value is 1.234. Any required accuracy can be attained by taking the mean of a great enough number of ordinates.

Applying this formula to the 4-fold figures whose bluntness is unknown we obtain the following values, accurate to all the figures given:

5-Hedroid	0.193
120-Hedroid	6.28
600-Hedroid	5.45

SOME PHASES OF THE EDUCATIONAL PROBLEM.

EDWARD C. KIRK.

[Abstract of address delivered at the Annual Banquet of the Eighth District Dental Society of New York, Buffalo, January 25, 1893.]

All education is the adaptation of certain means to certain ends which are represented by the needs created by the conditions of our social organization at any given time, and as these social requirements undergo alteration by the evolution of changed social conditions, a correlative change in educational systems necessarily takes place in adaptation to the altered requirements. It must be admitted at the very outset that the

acquisition of all knowledge is utilitarian in its object—utilitarian in the broadest meaning of that term. The nature of the use to which knowledge is to be put necessarily determines the character of the knowledge to be acquired, hence the diversity of elements which may constitute an educational system; but whatever may be the elements, the end is necessarily that the power acquired thereby shall be of use.

The interest which surrounds the question of education in general has its corresponding manifestations in dentistry. Dentistry requires something more for its successful practice than general and technical knowledge; it demands in the majority of its procedures the highest development of technical skill. A man may be a brilliant genius intellectually and a flat failure as a dentist. He may be a walking encyclopedia of knowledge without the ability to successfully fill or treat a diseased tooth. It is a happy combination of these elements of technical knowledge and manipulative skill in the individual which places him in the front rank of superior dentists. Therefore, if a preliminary examination is to have any value in testing the fitness of a candidate to enter upon the dental curriculum, it must satisfactorily determine whether he is possessed of those qualities, natural or acquired, which make him capable of further acquiring that high degree of manipulative skill which it is a function of the dental curriculum to impart. Such a knowledge of the fitness of a candidate, there is good reason for believing, can be better acquired by a preliminary examination modeled upon the final examinations of our highest grade manual training school, which require, besides history, languages, mathematics, English, a good working knowledge of the physical sciences, drawing, etc., a practical demonstration of the manual dexterity of the student, which tests his knowledge of tools, their manufacture and uses, coupled with a full degree of familiarity with the physical properties of the materials upon which the tools are employed, and a practical knowledge of the constructive uses to which these same materials are put. It is along this line that the technical part of the dental curriculum is being developed, and there is every reason why the same idea should, to a degree, be included in the examination which serves as the entrance to that curriculum. The preliminary examination should therefore be selective in quality and directed towards the discovery of the natural qualifications of the candidate and his fitness for entrance upon the study of dentistry, not whether he is fit to study law, medicine or theology, which could be as readily deduced from a preliminary examination in arts or letters exclusively. What is needed, as the motive force of the college course is a constant effort to inculcate principles; methods and details are of secondary importance. It is the effect of the inculcation of principles to which we look for the development of intellectual power, and power is the end of education.

Methods of dental teaching have been handicapped from the first by a lack of individuality and originality. Our system was an inheritance from medicine or a replica of the old methods in vogue for medical teaching. There has come with this inheritance an overweening respect for expert

opinion and so-called authority, and a correlated tendency to dogmatic teaching. One consequence of this inheritance is the lack of close relationship with dental needs which the teaching of certain branches of the curriculum often develops, *e. g.*, anatomy, physiology, chemistry and pathology. My criticism on much of the teaching in these branches would be not that the student fails to learn them, but he is too likely to learn them as abstractions, and it is often difficult to make him understand that those branches have any practical bearing upon his dental education. The fault is in the method of teaching. The evolution of society has carried us past the point where the individual can afford to depend wholly upon the investigations of others for his supply of knowledge. The tendency to-day is toward individual study and independent thinking. Teachers are but the guides who blaze the way along the path of knowledge; the student must get his facts, as far as possible, from nature's storehouse and train himself to understand their meaning and relationships.

Our schools should be producers of knowledge, not merely its conservators and transmitters. The production of men properly equipped for dental instruction is progressing much more slowly than it should. Where an institution has so systematized its methods of instruction that its corps of demonstrators are being trained in the art of teaching, it is creating its own skilled labor and carrying out the principle included as a working factor of all great enterprises by providing for succession in office. This feature should be so incorporated in the policy of each dental school that breaks from whatever cause in its faculty could be satisfactorily filled from its own corps of teachers by promotion, without shock to the even working of its educational machinery.

PROCEEDINGS OF THE GRADUATE BIOLOGICAL CLUB.

October 18, 1897.—Miss A. J. McKeag read a paper giving results of experiments on the existence of touch and pain spots in the skin of the hand, and exhibited apparatus used in the determination.

Dr. Adeline F. Schively gave a synopsis of her observations and experiments on the hog-peanut (*Amphicarpea monoica*), since published in *Contributions from the Botanical Laboratory*.

Professor Macfarlane reviewed recent papers by Mr. George Murray *On the Reproduction of Marine Diatoms; On the Relations of Green Seaweeds*, by Professor Chodat, and by Professor Fraser on *Snake Poisons and their Antidotes*.

November 1.—Dr. J. Percy Moore described and demonstrated under the microscope the structure of the sense organs in scutes of the marine anellid *Lepidonotus*.

Dr. Harshberger gave an account of the flora of Yellowstone Park, and referred especially to the *Algae* which caused coloration of the waters.

Professor Witmer gave an account of the papers brought before the Psychological Sections of the American and British Associations for the Advancement of Science.

November 15.—Professor Conklin gave an account of the work at Woods' Holl during the past summer, and outlined some of the changes that had been effected in the rules and organization of the institution.

Professor Witmer made a demonstration on memory, imagination and hallucination.

Dr. Calvert described the result of his researches during summer at Cambridge, Mass., on various groups of insects.

Dr. Montgomery gave the results of his observations on *The Reduction of Chromosomes in the Spermatogenesis of Pentatoma*.

Dr. Porter reviewed articles by Fischer on *Accepted Methods of Differential Histological Staining*, and by Lauterborn on *The Structure and Division of Diatoms*.

December 6.—Dr. Harshberger gave an account of the habits and histology of *Cholaria herginica*, and demonstrated specimens under the microscope.

Dr. Ferree Witmer gave an account of *Types of Insanity*.

Dr. Adeline Schively reviewed a paper on *Variations in the Leaves of Holly and Related Plants*.

December 20.—Mr. Cornman read a paper on *Spelling Errors and their Causes*.

Mr. Cornell reviewed the recently published paper by Dr. Mary Pennington on *A Chemico-Physiological Study of Spirogyra nitida*.

Professor Macfarlane described the new greenhouses of the Botanic Garden, and conducted members through the entire suite, when he explained the principles of grouping the plants.

January 3, 1898.—Dr. Calvert described *Variation of Generic Characters as Illustrated by Certain Genera of Dragon Flies*.

Dr. S. C. Schmucker spoke of his observations on the nests and habits of the mound-building ants of Pennsylvania.

Miss Nichols reviewed a paper by Apathy on *The Conducting Element of the Nervous System and its Topographical Relations to the Cells*.

Professor Macfarlane exhibited a papery sheet recently received from Miss E. Woolman, which he found to be a felted mass of the *Alga oedogonium*, and specimens were exhibited under the microscope.

January 17.—Professor Macfarlane read a paper by Dr. L. L. W. Wilson on *The Structure of the Vegetative System of Conopholis Americana*.

Mr. Wieland described the remains of the plastron of *Protostiga gigas*, found by him in the Port Pierre deposits.

Mr. Crawley gave an account of Professor Cope's views on consciousness.

February 7.—Professor Conklin, Dr. Porter and Dr. Montgomery discussed the significance of the *Centrosome*.

Professor Macfarlane gave a description of a visit made during the previous week to Wilmington, N. C., and exhibited growing specimens then obtained.

February 21.—Professor Witmer spoke on *The Quantification of Mental States.*

Dr. Harshberger described his observations *On the Arrangements for Water Storage and Conduction in Senecio præcox*, and exhibited specimens.

Professor Macfarlane exhibited and remarked on a collection of living filmy ferns, from Jamaica, given by Mr. Schummo to the Botanic Garden.

Dr. Calvert described observations on the functional activity of the gizzard in certain insects.

DEPARTMENT OF LECTURES.

The following schedule has been prepared for the BULLETIN by Mr. Eugene Ellicott, Secretary of the Department, and shows the dates, towns, counties and subjects covered by the lecturers since the list published in the February issue.

Date.	Town.	County.	Lecturer.	Subject.
Jan. 1	Catawissa . . .	Columbia . . .	Ravenel	Hygiene.
Jan. 7	Pittsburg . . .	Allegheny . . .	Learned	German.
Jan. 8	Richboro . . .	Bucks	Ravenel	Hygiene.
Jan. 8	Pittsburg . . .	Allegheny . . .	Learned	German.
Jan. 11	Erie	Erie	Jastrow	Semantics.
Jan. 14	Johnstown . . .	Cambria	Conklin	Embryology.
Jan. 14	York	York	Penniman	English.
Jan. 15	Port Royal . . .	Juniata	Penniman	English.
Jan. 15	Millersburg . . .	Dauphin	Brumbaugh	Pedagogy.
Jan. 20	Braddock	Allegheny . . .	Jastrow	Semantics.
Jan. 21	Elysburg	N'Thumberl'd	Rothrock & Ravenel	Botany and Hygiene.
Jan. 21	Carbondale . . .	Lackawanna . .	Penniman	English.
Jan. 21	Bethlehem . . .	Northampton . .	Learned	German.
Jan. 22	E. Stroudsb'g .	Monroe	McMaster	American History.
Jan. 22	Scranton	Lackawanna . .	Penniman	English.
Jan. 22	Edinboro	Erie	Jastrow	Semantics.
Jan. 25	Ephrata	Lancaster . . .	Rothrock	Botany.
Jan. 27	Honesdale . . .	Wayne	Rothrock	Botany.
Jan. 27	Braddock	Allegheny . . .	Doolittle	Astronomy.
Jan. 28	Montrose	Susquehanna . .	Rothrock	Botany.
Jan. 28	Titusville	Crawford	Doolittle	Astronomy.
Feb. 4	Erie	Erie	Rowe	Political Economy.
Feb. 4	Scranton	Lackawanna . .	Penniman	English.
Feb. 9	Richboro	Bucks	Harshberger	Botany.
Feb. 9	Avondale	Chester	Ravenel	Hygiene.
Feb. 11	Somerset	Somerset . . .	Harshberger	Botany.
Feb. 11	Johnstown	Cambria	Child	English.
Feb. 11	Corry	Erie	Conklin	Embryology.
Feb. 12	Johnstown	Cambria	Child	English.
Feb. 18	Thurlow	Delaware . . .	J. F. Johnson . . .	Journalism.
Feb. 19	Lititz	Lancaster . . .	Learned	German.
Feb. 24	Lansdale	Montgomery . .	Learned	German.
Feb. 25	Pittsburg	Allegheny . . .	Barker	Physics.
Feb. 25	Corry	Erie	Conklin	Embryology.
Feb. 25	Lancaster	Lancaster . . .	Brumbaugh	Pedagogy.
Feb. 26	Muncy	Lycoming . . .	Rothrock	Botany.
Feb. 26	Erie	Erie	Conklin	Embryology.
Mar. 4	Hanover	York	Conklin	Embryology.
Mar. 5	Downingtown . .	Chester	Brumbaugh	Pedagogy.
Mar. 8	Hazleton	Luzerne	Penniman	English.
Mar. 10	Huntingdon . .	Juniata	Ravenel	Hygiene.
Mar. 11	Ephrata	Lancaster . . .	Learned	German.
Mar. 12	Hanover	York	Harshberger	Botany.
Mar. 15	Hazleton	Luzerne	Falkner	Economics.
Mar. 18	Scranton	Lackawanna . .	Munro	History.
Mar. 22	Hazleton	Luzerne	Ravenel	Hygiene.

Publications
OF THE
University of Pennsylvania

Group I.—Annual Publications.

University Catalogue (published in December).

Fasciculi of the Departments of Philosophy (Graduate School), Law, Medicine, Dentistry and Veterinary Medicine; also Circulars of Information concerning courses offered in the College: No. 1 (School of Arts); No. 2 (Towne Scientific School); No. 3 (Courses for Teachers).

Report of the Provost (published in January).

Group II.—Serial Publications.

Series in Philology, Literature and Archaeology.

Series in Philosophy.

Series in Political Economy and Public Law.*

Series in Botany.

Series in Zoölogy.

Series in Mathematics.

University Bulletin (monthly).

Group III.—Occasional Publications.

Reports of the Museums of Archaeology and Paleontology.

Theses presented for the Degree of Doctor of Philosophy.

†*Group IV.—Affiliated Publications.*

Annals of the American Academy of Political and Social Science.

Americana Germanica (quarterly).

Bulletin of the Free Museum of Science and Art.

Translations and Reprints from the Original Sources of European History.

EXPLANATORY.

Group I consists of publications issued annually under the direct auspices of the Provost and Trustees.

The University Catalogue is a volume of about 500 pp. It contains detailed information concerning all departments, lists of officers and

* Beginning with New Series, No. 1.

† For exchange purposes only.

students, with addresses, etc. No charge is made for the Catalogue, but in all cases requests for a copy by mail must be accompanied by ten cents in stamps to cover postage.

The Fasciculus of each department contains information concerning that department *only*; while the three College Circulars of Information, covering respectively the School of Arts, the Towne Scientific School, and the Courses for Teachers, are in like manner restricted as to their contents. The Fasciculi and College Circulars are published separately after the University Catalogue, of which they are, to a large extent, reprints. Single copies are mailed free upon request.

The Report of the Provost, made by him annually to the Corporation, constitutes a general review of University activities during the year, and contains *inter alia* reports from the Treasurer and the several Deans. Single copies are mailed free upon request.

Group II consists of a number of serial publications in the several fields of literature, science and philology. They are issued in separate series at irregular intervals (for the most part), and represent the results of original research by, or under the direction of, members of the staff of instruction of the University. A complete list of these publications to date, *with prices attached*, is printed at length following. They are published under the editorial supervision of the University Publications Committee.

Group III consists of occasional publications, such as reports of the various University departments (where printed separately), and certain theses presented in partial fulfillment of the requirements for the degree Doctor of Philosophy.

Group IV consists of affiliated publications, issued as separate periodicals, not under the control of the University, but edited in part by officers of the University of Pennsylvania. Copies are obtainable from the University only through the medium of exchange (see Exchange Bureau, below).

EXCHANGE BUREAU.

The University of Pennsylvania desires to extend its system of exchanging publications with other similar institutions and learned societies, both at home and abroad.

For convenience in correspondence, the following statement is made:

To those educational institutions and learned societies which issue only annual catalogues, reports, [or similar publications, the University of Pennsylvania offers in exchange all those of its own publications classed under **Group I** and **III**, or as many of them as may be specified.

To those educational institutions and learned societies publishing *also* results of original investigations, the University of Pennsylvania offers in exchange any one of its equivalent series in **Groups II** and **IV**, or as many of them as may be mutually agreed upon in order to maintain a proportionate ratio of exchange.

In establishing a system of exchanges with any other institution, the University of Pennsylvania binds itself to the following regulations:

All publications agreed upon to be forwarded from Philadelphia to address furnished, immediately upon issue, free of expense to our correspondent.

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Volume II.

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6. **The Principles of Rational Taxation.** (Read at a meeting of the Association, November 21, 1889.) By SIMON N. PATTEN.
7. **The Federal Constitution of Germany.** With an historical introduction, translated by EDMUND J. JAMES.
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- 8. Maize: A Botanical and Economic Study.** By JOHN W. HARSHBERGER, PH.D.

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- 9. A Chemico-Physiological Study of *Spirogyra nitida*.** By MARY E. PENNINGTON, PH.D.
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- 2. Properties of the Locus $r = \text{Constant}$, in space of n Dimensions.** By PAUL R. HEYL, B. S.

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PROCEEDINGS OF THE CORPORATION.

At a stated meeting, held on May 3, 1898, the following business was transacted:

Leave of absence was granted to Professors Hermann V. Hilprecht, John Guitéras, H. W. Spangler, and to Dr. John W. Harshberger. The resignations of Prof. C. Stuart Patterson, from the chair of Constitutional Law and the Law of Real Estate and Conveyancing; and of Assistant Professor Edgar V. Seeler, from the chair of Design, were accepted with expressions of appreciation and regret. Mrs. George D. Widener was appointed a manager of the Graduate Department for Women, and Dr. Adelaide Ward Peckham was appointed Thomas A. Scott Fellow in Hygiene. Thanks were voted as follows: To Col. Joseph M. Bennett, for the gift of four properties on Walnut street below Thirty-fourth street, adjoining the premises 3348-50 Walnut street, for the purposes of the higher education of women; to University Alumnae for funds to establish an Alumnae Graduate Fellowship for Women for at least three years; to "Anonymia" for guarantee of subscription for the support of the Woman's Table at Naples Biological Laboratory; to Dr. S. Weir Mitchell, for gift of books; to Allen Childs, Jr., for gift of a copy of the Commencement programme for 1837; and also to donors of funds. The appointments to certain Fellowships and Scholarships in the Department of Philosophy (Graduate School) were approved. The George Leib Harrison Fellows were granted permission to serve as monitors at the Medical examination of 1898.

THE POSITION OF THE TRUSTEES ON THE HIGHER EDUCATION OF WOMEN AT PENNSYLVANIA.

At the May meeting of the trustees, a resolution of thanks to Col. Joseph M. Bennett for the gift of four houses adjoining Bennett Hall was passed, concluding with the following words: "On the foundation provided by Col. Bennett's former gifts of property and endowments, the trustees have established a graduate department for women, which has been eminently successful, and they are encouraged by this later donation to hope that his liberality may be so seconded by the community as to enable them in the near future to offer full undergraduate courses for women equivalent to those now enjoyed by men." There is no violation of the confidence of the trustees in stating the purpose in their minds in this deliberately and carefully worded resolution.

Nearly ten years ago a very earnest appeal was made to the trustees to admit women to the College. A number of meetings and conferences were held for the thorough discussion of the question, and the result was a formal resolution to the effect that they deemed it inexpedient to open the existing college courses to women, but that they were ready and willing to open precisely similar courses to them, just so soon as funds were placed in their hands for that purpose. Directly afterwards Col. Bennett presented to the University the two buildings now known as Bennett Hall, stipulating only that they should be used for the higher education of women. This brought the question again before the board. It was evident that Col. Bennett's gift, valuable as it was, did not at all provide the trustees with the means needed for establishing an undergraduate college for women, and no one else offered to provide anything for that purpose from that day until now. The trustees therefore, with Col. Bennett's full assent, resolved to use the buildings for a graduate women's college, and towards its maintenance received from him and a few

others a moderate endowment of graduate scholarships in connection with it. This work could be carried on, and has been carried on, without trenching upon the general funds of the University, and has been eminently satisfactory. During all these years the offer of the trustees to establish an undergraduate college for women whenever funds for that purpose were placed in their hands has remained an open offer. With the inevitable changes in the personnel of the Board, there has been no change in its opinion on this subject. It is still positively averse to opening the present college courses to women; it is still cordially ready to establish equally thorough courses for women, whenever it can do so. The conferences which have resulted in Col. Bennett's latest gift have been going on quietly for many months, and were without any outside suggestion or influence. The new houses were given by him for the single purpose of "the higher education of women." They are not needed as dormitory or teaching halls for graduate women students. Revenue from them might be applied to increasing graduate fellowships for women, and so strengthening the department, in strict accordance with the terms of the gift; but the trustees felt that this was another opportunity for the advocates of the college education of women in Philadelphia. Here are the premises which can be made available for it. The items of expense are by so much reduced, and that much less will be required to establish the college. Their resolution meant that the liberality of Col. Bennett ought to encourage and stimulate the friends of collegiate education for women to give, and induce others to give, until a sufficient fund was raised to enable the trustees to do what they have been heartily ready to do for the last ten years, and what they *cannot* do with endowments placed in their hands for a specifically different purpose.

JESSE Y. BURK,
Secretary to the Board of Trustees.

**ADVANCED REQUIREMENTS OF ADMISSION TO THE DEPARTMENT
OF DENTISTRY.**

At the time of its organization (1878) the Department of Dentistry had a curriculum and a length of term equal to those of other first-class dental schools in the United States, but early in its career the scope of the curriculum was gradually enlarged and the length of its sessions similarly increased. In 1884 the sessions were increased in length nearly two months, and in 1894 the length of the term was made coincident with that of the other departments of the University. Notwithstanding the lengthening of the course and the enlargement of the curriculum, both of which entailed additional expense and labor on the part of the student, a steady growth has been maintained, and a regular ratio of increase in the size of its classes has been apparent.

The Department has recently made another advance in the matter of elevating its standard of entrance requirement; a step befitting the twentieth anniversary of its existence. While it had previously an entrance requirement as high as other dental schools in the State, the new plan of advanced requirement now in effect will eventually place the Department of Dentistry on a par with the highest grade dental schools in the country, and far in advance of the average. The plan of the increased entrance requirements has been outlined as follows:

Candidates for admission will be required to present evidence of preliminary education as follows: for the session of 1898-99 a certificate of High School entrance; for the session of 1899-00 a certificate of two years' High School attendance; for the session of 1900-01 a diploma of an approved High School having a three years' course, or a certificate showing three years' attendance at a High School having a four years' course; or certificates from other schools showing equivalent education. In lieu of such

diplomas or certificates the applicant will be required to pass a matriculate examination, which shall in each case be the equivalent of that forming the basis of the certificates of required preliminary education.

ETHNOGRAPHICAL DATA.

M. D. Learned has recently inaugurated a series of investigations into the ethnography of Pennsylvania, by issuing questions in the form of circulars touching different phases of the subject. Circular No. 1—Preliminary, containing questions of a general character, was published in Vol. I, No. 3, of *Americana Germanica*. In response to this inquiry, much interesting and valuable material has been received from various parts of the State, such as ballads; local history and traditions; changes in names of persons and places; names of local antiquarians; collections of books, and relics of various kinds; original manuscripts, dating in some instances as far back as the Revolution, and containing historical accounts and literary productions, all of which shed new light upon the history and ethnography of America.

Other circulars of a more special character are to follow, and will be widely distributed to local historians, school teachers, and others who are able to help in the work. It is expected that material thus collected will form the basis of a more scientific treatment of the contribution which the Germans and other ethnic elements have made to the cultural development of the American people, and thus aid in tracing the origins of our national life and institutions.

The results will be published, as rapidly as the material will admit, in parts treating separately each ethnic element—German, English, Swedish, Welsh, etc. Ethnographical charts are to accompany the work, setting forth the cultural epochs and racial complexion of the present popula-

tion, including the speech boundaries. It is hoped that the work thus begun in Pennsylvania may be extended over the country at large, and that finally the State and National census bureaus may be enlisted in facilitating the collection of such data. Historical, genealogical and antiquarian societies are invited to co-operate in collecting material.

The University of Pennsylvania will receive and place in safe keeping any collections which may be presented or loaned for this work, and due recognition will be given in print to all persons contributing to the enterprise.

NOTES.

Germanics.

The Germanic Association of the University of Pennsylvania was organized early in the fall of 1895, and is composed of the instructors and graduate students of the Germanic department. The meetings are held monthly, and only original papers are presented, other communications and reports being reserved for the Journal Club meeting, which is also held monthly. Germanists and others interested are frequently invited to attend the meetings as guests of the Association. The following papers have been read during the current academic year:

Learned, M. D., "Francis Daniel Pastorius' 'Bee-Hive or Bee-Stock.' "

Gudeman, A., "Disputed Passages in Tacitus' '*Germania*.' "

Wesselhoeft, E. C., "The Position of the Verb in Dependent Clauses in Abraham a Santa Clara."

Shumway, D. B., "The Genitive in Sebastian Brant's 'Narrenschiff.' "

Prettyman, C. W., "A Parallel to the old German Poem 'Peter von Staufenburg.' "

Collitz, Hermann (of Bryn Mawr College) (1) "A Misunderstood Passage in Goethe's 'Faust'" (*Vorspiel auf dem Theater*, v. 122); (2) "Sunufatarungo(s)" (*Hildebrandslied*), v. 4.

Mathematics.

The seventh meeting of the Mathematical Club for the year 1897-98 was held on Friday, April 22, at 8 p. m. Mr. H. B. Evans read a paper upon "An American Development of the Theory of Least Squares," which was of great historic interest as showing the part played by Dr. R. Adrain, at one time Professor of Mathematics in this University, in the development of the theory. Professor C. L. Doolittle followed with some remarks upon the hypotheses underlying the investigations of La Place and Gauss in the same subject, and upon the work of Poisson and Glaisher in simplifying the analysis of La Place. An abstract of Mr. Evans' paper is given elsewhere in this issue.

Library.

The University Library has just received a fine engraving by Samuel Sartain of the Rev. Philip Mayer, who was a trustee of the University from 1824 to 1858. The engraving was sent as a gift by the Board of Trustees of St. John's Evangelical Church of Philadelphia. Accompanying the engraving (which is a proof copy) was a biographical sketch of Dr. Mayer, from which we extract the following: He was born in New York, April 1, 1781. His father, George Frederick Mayer, was an emigrant from Suabia, Germany, while his mother, Mary Magdalena Commandina, was a native of New York. Dr. Mayer entered Columbia College in 1795 and graduated in 1799. On leaving college he pursued theological studies under the Rev. Dr. Kunze and obtained license to preach in 1803. In 1806 he accepted a call from the St. John Evangelical Lutheran Church of this city and remained its pastor until his death on April 16, 1858. He received his degree of D. D. from the University of Pennsylvania.

Besides his connection with the University, he was for many years president of the Pennsylvania Bible Society, of the Institution for Deaf and Dumb, and of the Philadelphia Dispensary.

Medicine.

A committee of the faculty of Medicine has been appointed to act in conjunction with the Provost and Trustees in the erection and equipment of a new building, which is to be used for the purposes of physiological, pathological and pharmacodynamical laboratory work. Provisional plans of the building are at present making under the supervision of an architect. The accommodations to be furnished by this building are much needed by the Department of Medicine, as at present the laboratories above named are occupying inadequate quarters. The building will include large laboratory rooms; demonstration rooms; a room equipped with suitable machinery for the construction of physiological and other apparatus; a number of rooms to be used by individuals prosecuting original research in physiology, pathology and pharmacodynamics; professors' rooms; and rooms for working libraries. It is expected that the building will be erected in the near neighborhood of the University, three stories in height; the façade to be similar in style to the façade of the Chemical Institute of the University at Strassburg in Germany, and to be constructed of light colored terra cotta.

Horatio C Wood, Jr., M. D., son of Professor Horatio C Wood, who for some time past has been prosecuting research work in the laboratory of Professor Kronecker in Bern, Switzerland, was elected at the April meeting of the Corporation to the position of Instructor in Pharmacodynamics. Dr. Wood will return from Europe in time to begin the course of instruction in his subject next October.

ABSTRACTS OF RECENT PAPERS.

The Agamemnon of Æschylus.

WILLIAM A. LAMBERTON.

[Abstract of paper read before the Classical Club, March 11, 1898.]

In considering the *Agamemnon*, we cannot isolate it from the two other plays which form with it the total of Æschylus' subject. It is related to them not only as giving the initial stage of the story, but in its own internal development as well. Certain details that might perhaps have been omitted, were the tragedy of Agamemnon's death alone

to be set forth, must be included when the canvas is extended to include the whole tragic story of the Pelopid house.

The subject of the trilogy is the satisfactory resolution of the problem of fate and due retribution involved in a series of crimes from the days of Atreus down to those of Orestes. When Clytemnestra declares that her deed, though done by her hand, was really perpetrated by the haunting spirit of the Plisthenidae, we may fairly accept this as a statement of the poet's intent, while at the same time admitting that from the point of view of character development it has quite another force. This tragic history, with its bequest of the duty of vengeance from father to son, called for a solution from the point of view of poetic and religious ethics, as well as from the peculiar fact that no properly authorized person was left to exercise this right and duty upon Orestes.

The *Agamemnon* is the first step towards this solution : it is the beginning of the end in the dreadful story. As such it must contain within itself the implication of the past, as well as the first positive acts pointing to the future. All the significant overt acts connected directly with the murder of Agamemnon and leading immediately to it must be included, and the conditions at Argos that made the murder possible must be set forth. We need a sympathetic depiction of the uncertainty and anxiety that had come to prevail in and about the palace in view of the disquieting behavior of its mistress ; we need to know what personal motive was working upon her, and how she had shaped her plans not to be taken unprepared by an unexpected return of her husband. Hence the watchman's soliloquy at the opening, and hence the long parados in which the genesis of the events is elaborately set forth from the departure of the fleet for Troy, and the immediate provocation in the sacrifice of Iphigenia is carefully and feelingly described. In both of these passages the tone is that of gloomy foreboding of impending disaster. If these passages introduce elements that disturb the time relations of the play, this could hardly have been avoided without disturbing more seriously yet the dramatic purpose of the poet.

Yet as regards these much discussed time relations, the views that have been set forth by Dr. Furness, who has discussed this subject in the light of now acknowledged principles of Shakespearean dramatic construction, appear to offer a complete solution of the difficulty. Dramatic time implies two things : first, time actually occupied by the significant dramatic events; second, antecedent or intervening time, in which no event of the plot occurs, but the gradual evolution of the conditions necessary to these events is contained. In the action upon the scene, the poet has disregarded as non-existent, one might almost say has annihilated, the long intervals at various stages between the taking of Troy and Agamemnon's arrival at Argos. He has done this with the purpose of exhibiting in a strikingly effective way the inevitable connection of these significant events, and of preventing their fateful and necessary concatenation from being overlooked by reason of mutual remoteness. On the other hand, in the account of the story of the beacons as told by

Clytemnestra, and especially in the herald's account of the perils and disasters of the homeward voyage, the time intervals of these dramatically consecutive facts are clearly brought out. It is now the poet's desire to impress upon his audience the serious importance of each of them; they were not mere accidents, not such as could be the outcome of short preparation and few and unimportant antecedents. The slow preparatory grinding, as it were, of the mills of the gods is made clear in these narratives, while the scenic action exhibits with appalling immediacy the crushing result of this process. Time, as treated by the poet, is dramatic, not horologic; and is adjustable, like other things, to the necessities of the situation, being expanded or contracted as dramatic motive demands.

Worthy of note is the fact that the elaborate catalogue of the signal stations gives fitting room in space, and inferentially in time, for the incidents of the herald's story.

With consummate art the poet has combined a presentation of human action on the scene with divine action antecedent and not less significantly concurrent. The human action takes place under our eyes in close dramatic and logical sequence; the divine we get in glimpses, as it suits the poet's purpose to reveal it. This revelation is made partly through the chorus, partly through the herald, but chiefly through the inspired utterances of the discredited prophetess Cassandra. Herald and chorus can tell only of what they have seen and heard; Cassandra can recall the remote past and forecast the still threatening future. She reveals the original causes, while chorus and herald only suffice to develop the more immediate occasions.

From a religious and ethical point of view, Aeschylus preaches, the doctrine that to shed blood in vengeance for blood already shed is not satisfactory; nor is it improved when backed up by a "thus saith the Lord." The cry of Aeschylus is $\tau\delta\ \delta'ev\ vuk\atw$. The punitive powers, which regard only the guilt of bloodshed, and the Delphic god, who insists upon the son's duty to exact retribution for the murder of his father by himself slaying the murderer, no matter whom he may be, must be brought into harmony by the goddess of wisdom, and thus a stay must be put to this horrible series of crimes engendered by crime. The right to punish is to be transferred from the individual to the religious tribunal of the state, as representative of the religious and ethical wisdom of God: the right of vengeance is to be transformed into the right of duty of administering justice.

An American Development of the Method of Least Squares.

HENRY B. EVANS.

[Abstract of paper read before the Mathematical Club, April 22, 1898.]

No measurement of a quantity which is directly or indirectly measurable is free from error. When more than one such measurements are made, it is necessary to obtain from these latter the most probable value

of the quantity under consideration. The method now in constant use for accomplishing this purpose is the "Method of Least Squares," which is, in the words of Professor Cleveland Abbe, "the most valuable arithmetical process that has been invoked to aid the progress of the exact sciences." It comes to us directly from the work of Gauss and Legendre in the early part of this century, who, however, developed, published and used it long before any proof of its theoretical correctness appeared. The first printed proof of the law on which the method is based was published in America in 1808. Its author, Dr. Robert Adrain, later professor of mathematics in this University, appears to have been entirely ignorant of the work of the European mathematicians, and therefore must be credited not only with the first proof of the idea, but also with its independent invention. In 1808 Dr. Adrain was editor of the "Analyst, or Mathematical Museum," a paper devoted mainly to the publication and solution of mathematical problems. In its second number appeared the following problem proposed by Robert Patterson, who was then professor of mathematics in this University:

"Question by Robert Patterson, of Philadelphia, for the best satisfactory solution of which to be adjudged by the editor, he offers a prize of ten dollars. In order to find the content of a piece of ground, having a plain level surface, I measured with a common circumferentor and chain the bearings and lengths of its several sides or boundary lines. But on casting up the difference of latitude and departure, I discovered, what will perhaps always be the case in actual surveys, that some error had been contracted in taking the dimensions. Now it is required to compute the area of the enclosure on the most probable supposition of this error."

The subject of probability seems to have been too much for the regular solvers to attempt, for no solution appeared, and the editor was obliged to repropose the problem in the third number of the magazine. Just before it went to print, however, a solution did arrive from Dr. Bowditch. In his solution the latter makes use of the following assumption, namely, that in measuring a line the error committed is probably proportional to the length of the line. Whether or no Dr. Adrain had this principle in mind before Dr. Bowditch's solution reached him will probably never be known. Whichever is the case, Dr. Adrain seized it, and using it as a basis he developed the Method of Least Squares and the first published proof of the exponential law of the probability of the occurrence of any given error in a series of measurements. Not content with this first proof, he followed it immediately with another entirely independent of the first, and then applied the method to the solution of several practical problems, one of which was Dr. Patterson's prize problem.

The "Analyst" was not widely circulated; copies of it are nowadays extremely rare. In it Dr. Adrain's invention and proofs lay buried and forgotten, while the European inventors perfected and spread their methods throughout the scientific world. In 1871 Professor Abbe first called attention to Dr. Adrain's work, in an article in the *American Journal of Science*. Since then his two proofs have received more atten-

tion. Both are more or less defective, but this can be said of every proof of the method that has been given. Nevertheless the first proof has as eminent an authority as Dr. Bowditch in its favor, and the second proof is identically the same as that given by Sir John Herschel in 1850. Taken together they form America's first important original work in pure mathematical science.

The Genitive in Sebastian Brant.

DANIEL B. SHUMWAY.

[Abstract of paper read before the Germanic Association, February 16, 1898.]

The paper opened with an introduction in which was shown that, among the many criteria of distinction between Middle High German and New High German, and especially between early and present New High German, one of the most interesting is the gradual limitation of function which the genitive case has suffered. The earlier N. H. G., in spite of some confusion, remained comparatively true in this respect to the M. H. G. standards. It therefore forms a medium of comparison, lying somewhat nearer to us than M. H. G., but far enough removed to render the comparison instructive as an instance of the continual change to which every living language is subjected.

Continuing, it was pointed out that evidences of decay were not wanting in early N. H. G. as compared with M. H. G. standards. This was illustrated by various examples. After stating that the literary norm of sixteenth century German was to be found mainly in the writings of Luther and his imitators, whose language was based on that of the Imperial Chancellery, the paper proceeded to investigate the syntax of Sebastian Brant with respect to his use of the genitive, and to compare his usage with that of his contemporaries. It was shown first that Brant was especially adapted to purposes of investigation and comparison, as he was not only free from the influence of the *gemeindeutsch*, but because he, differing from most writers of his time, did not exhibit indifference as to the fate of his manuscript in the hands of the printer. On the contrary, he exerted a careful oversight and insisted that the printed text should be an exact reproduction of his manuscript. We have therefore, as Zarncke stated, in the *Narrenschiff* of Brant an accurate picture of the Upper Alsatian dialect of the closing years of the fifteenth century.

For the purposes of the investigation all the occurrences of the genitive in the *Narrenschiff* were collected and classified, so that absolute certainty with respect to the usage in every case was attained. The method of treatment was: (1) The genitive with substantives, including genitive of possession, genitive denoting relationship, quality and time, subjective and objective genitive, etc; (2) partitive genitive, including genitive with

numerals, pronouns, and adverbs used as nouns; (3) genitive with verbs, reflexive, impersonal, expressing separation, emotion, partaking of verbs of thinking, saying, etc.; (4) genitive with adjectives, adverbial genitives and genitive with prepositions.

As the result of this detailed examination, it was shown that Brant is in many respects much more radical than the majority of his contemporaries; that is, he exhibits greater evidences of decay than those writing under the new literary norm, in that he shows a tendency to limit the function of the genitive and to replace it either by the nom.-acc., or by a preposition. The main points of decay were shown to be as follows: The replacing of the gen. of the neuter pronouns by the nom.-acc. form, *d̄es* by *das*, *wes* by *was*, etc. Further, the partitive genitive is largely replaced by the appositional construction in use to-day, whereas in Luther and Murner, to judge by the investigations of Francke and Voss, the genitive seems to be the invariable rule. With verbs of eating and drinking, where, for example, Luther's Bible translation employs usually the gen., we find in Brant only the acc. In the case of the verbs *geniessen*, *pflegen*, *vergessen* and *dürfen*, by the side of the more frequent gen., instances of the acc. already occur. In the case of *begehrēn* the acc. has already won the supremacy over the gen., whereas according to Voss the acc. is very rare in Murner. With Luther, too, the gen. is usual, and of several examples given by Kehrein from as late a work as the Catholic Bible of 1571, all exhibit this case. These points were all illustrated by examples.

At this point the question naturally suggested itself; why should Brant, standing nearer to the M. H. G. period, as he does, show greater evidences of decay, of a more marked tendency to depart from the classical standards, than do the writers of the sixteenth century who succeeded him? To answer this question with perfect certainty one would have to be in possession of a much more accurate and detailed knowledge of the syntax of the periods in question than is generally the case to-day. The following solution to the problem was, however, offered: Is it not possible that Brant, writing without any especial traditions or norm except the usage of the educated classes of his province, represents very accurately the regular development of his dialect after the breaking up of the M. H. G. standards, and that this dialect already exhibited to quite an extent the tendency to confusion and decay which we find in his writings? On the other hand, Luther and the admirers and imitators of his style, using the *gemeindeutsch* based upon the language of the Imperial Chancery, wrote under the influence of literary tradition, which is always more conservative than the language of every-day life. This being true, we have then to suppose that a marked tendency toward confusion, such as is exhibited by Brant, existed during the transition period, and that this tendency received a sudden check through the general adoption of the *gemeindeutsch* and usage of Luther; which, based as it was upon a well-established literary tradition, cleared up the growing confusion, and revived to a considerable extent older and more correct methods of expression.

The few examples given by Kehrein from writings of the fifteenth century would seem to corroborate this theory. Its complete establishment, however, would require a careful examination of a large number of texts of this period. This, the author said in closing, he hoped to do, and to present the results of such an examination in a special paper at some future time.

Position of the Verb in Dependent Clauses in S. Clara's "Judas der Ertz-Schelm."

E. WESSELHOEFT.

[Abstract of paper read before the Germanic Association, March 16, 1898.]

The purpose of the paper was to give an accurate statement concerning the position of the verb in the dependent clauses of the above-mentioned work, the first volume of which appeared 1686 at Salzburg.

The results show that of 2743 dependent clauses, only 480 do not have the verb final, and that of these 480 clauses, there are only 100 wherein the verb immediately follows the subject. The reasons which have induced the writer, although unconsciously, not to place the verb final in these 480 clauses, are then taken up and discussed in detail. Attention is drawn to the fact that S. Clara does not write the literary German, which Luther had formed on the basis of the "Kanzleisprache," but he writes in "Oberdeutsch," which the opponents of the reformation had consciously preserved in their writings. As regards the end-position of the verb in dependent clauses, however, the paper shows that here also we have the general tendency to place the verb final in dependent clauses; or in the exceptional cases, when the verb is not final, the tendency is to throw the verb from its customary secondary position in the clause more towards the end of clause. For the purpose of comparing this end-position of the verb in "Judas der Ertz-Schelm" with a contemporaneous writer, who represents fully the adapted *Schriftdeutsch* of the end of the seventeenth century, Zigler's "Asiatische Banise," published in Leipsic in 1688, has been investigated. The result shows that here the verb has the end-position in every dependent clause with a regularity unknown even to a great many writers of the present day. As, however, S. Clara's "Judas der Ertz-Schelm" is written in the form of a series of sermons, aiming more at rhetorical effect than purity of style, other works of his must still be examined to ascertain whether he does not conform more strictly to the rule of the end-position of the verb in dependent clauses in those of his works which are less rhetorical.

A Parallel to the Old German Poem "Peter von Staufenberg."

C. WILLIAM PRETTYMAN.

[Abstract of paper read before the Germanic Association, March 16, 1898.]

About the year 1310, a certain Herr Egenolf von Staufenberg, living either in Strassburg or at the Castle Staufenberg in the Ortenau, composed a poem, in which he celebrated the adventures of his ancestor, "Herr Petermann der Diemringer von Staufenberg genannt."

This old poem was last edited by Edward Schröder: "Zwei Altdeutsche Rittermaeren, Moritz von Craon. Peter von Staufenberg, Berlin, 1894."

In his introduction, p. xl, Schröder characterizes P. v. S. as "eine der ältesten deutschen original Dichtungen romantischen Inhalts," but on p. xli, he adds: "Die deutsche Litteratur bot Herrn Eginolt eine Parallelie in der Geschichte des Grafen 'Partonopier von Blois' und der Fee 'Meliur,' der Schwester der Melusine, und es ist kein Zweifel dass die Lectüre dieses Werkes bei im nachwürkte."

Without entering into a discussion of Herr Egenolf's debt to Konrad von Würtzburg, it was the object of the paper to point out in French Literature a striking parallel which, apparently, had never been noted. This is to be found in "Marie de France's *Lai de Lanval*," which was probably written in England in the second half of the twelfth century (cf. Warnke: "Die *Lais* der Marie de France." Halle, 1885. Einleit, p. v). The poems were outlined briefly in order to show that each may be divided into two distinct parts. The first part contains the story of the hero's love for a woman of supernatural powers, and of a solemn pledge which he makes to her concerning his future conduct. In the German version he promises never to marry; in the French, he swears never to mention his mistress' name. A failure on the part of the hero to keep his pledge is punished in the German version by death; in the French, by the loss of his mistress. The second part of each poem describes the failure of the hero to keep his promise and the consequences of his infidelity.

The next portion of the paper was devoted to parallel passages from the French and German versions, to prove that the first part in each is the same, not only in "motif," but also in the succession of events. It was also shown that the transition from the first to the second part occurs at exactly the same place in both poems. In endeavoring to account for this parallel, it was concluded, for reasons which space prevents giving here, that neither poem is the original of the other, but that both are different versions of an older story.

Assuming the view just stated to be correct, the writer then discussed Schröder's opinion concerning the age of the "saga" upon which the story is based. Introduction, p. xlvi, he says: "Diese wird sich ursprünglich auf Herzog Berhtolt (1061-1073) bezogen haben." This theory is rejected because, between this date and the appearance of Marie's poem, sufficient time had not elapsed for a story originated on German soil to be transmitted orally to France, and to become so popular there that the name of the hero had already disappeared. The origin of the "saga" must therefore antedate Duke Berhtolt (1061-1073).

It was the opinion of the writer that if the conclusions reached in the paper were sound, they should be used to modify Schröder's statement concerning the age of the myth, and that "Peter von Staufenberg" should be added to the list of stories given by Reinholt Köhler in his "vergleichenden Aumerkungen" to the "Lais der Marie de France" (Warnke, pp. lxxxi-lxxxv).

UNIVERSITY BIBLIOGRAPHY.

Published since September 1, 1897.

ADAMS, JOHN QUINCY.

Review. Dallinger's Nominations to Elective Office in the United States. (*Annals of American Academy of Political and Social Science*, September, 1897.)

Review. Durand's Finances of New York City. (*The Citizen*, April, 1898.)

Proposed Reforms of the Monetary System. (*Annals of American Academy of Political and Social Science*, March, 1898.)

ADLER, LEWIS H., Jr.

The Treatment of Hemorrhoids by the Injection Method. (*Therapeutic Gazette*, August, 1897.)

ALLYN, HERMAN B.

A Case Apparently of Typhoid Fever Associated with Tuberculosis and Nephritis. (*University Medical Magazine*, December, 1897.)

The Possibility of Modifying the Contagious Diseases Act so as to Make it Less Stringent Without Lessening its Protective Power. (*Philadelphia Polyclinic*, March, 1898.)

AMES, HERMAN V.

The Proposed Amendments to the Constitution of the United States during the First Century of its History. Prize Essay. Published as Annual Report of the American Historical Association for the year 1896. Vol. II, pp. 442. Washington, Government Printing Office, 1897 (1898).

Review of William MacDonald's Select Documents Illustrative of the History of the United States. (*Annals of the American Academy*, May, 1898.)

ARNOLD, JOHN P.

A New Test for Lactic Acid in the Gastric Contents, and a Method of Approximately Estimating the Quantity Present. (*University Medical Magazine*, April, 1898.)

ASHHURST, JOHN, Jr.

Sketch of the Life of Professor Theodore G. Wormley. (*Transactions of the College of Physicians of Philadelphia* for 1897.)

BERGEY, DAVID H.

The Significance of the Occurrence of Pathogenic Spirilla in the Waters of the Delaware and Schuylkill Rivers at Philadelphia. (*Journal of the American Medical Association*, October 23, 1897.)

Bovine Tuberculosis in Its Relation to the Public Health. (*The Philadelphia Medical Journal*, April 9, 1898.)

BRINTON, DANIEL G

The Religions of Primitive Peoples. (1 vol., 8vo., pp. 264. New York, 1897.)

The Lost Civilizations of America. (Pp. 8. In *American Archaeologist*, February, 1898.)

Current Notes on Anthropology. (Weekly in *Science*. New York, 1897 and 1898.)

The Linguistic Affinities of the Huetares of Costa Rica. (In *Proceedings of American Philosophical Society*, December, 1897.)

Dr. Harrison Allen's Contributions to Anthropology. (Pp. 7. In *Proceedings of Academy of Natural Sciences, Philadelphia*, December, 1897.)

Note on the Classical Marmex. (Pp. 2. In *Bulletin of the Free Museum of Science and Art, University of Pennsylvania*, December, 1897.)

Maria Candelaria; an Historic Drama. (Pp. 98. Philadelphia, 1897.)

Native American Stringed Musical Instruments. (Pp. 2. In the *American Antiquarian*, January, 1897.)

The Missing Authorities on Mayan Antiquities. (In the *American Anthropologist*, June, 1897. Pp. 9.)

The So-Called Bow-Puller of Antiquity Identified as the Greek μυρμηξ. (In *Bulletin of the Free Museum of Science and Art*. No. 1, Vol. I, pp. 6. June, 1897.)

The Pillars of Ben. (*Ibid.*, pp. 8.)

BROWN, REYNOLDS D.

Railroad Reorganization Agreements. (*American Law Register and Review for 1897*, Vol. 45.)

BRUMBAUGH, MARTIN G.

Series of Pennsylvania. With Dr. JOSEPH S. WALTON. (American Book Company, N. Y. 350 pp.)

The Emotional Element in Education. An Address before the State Teachers' Association of Pennsylvania, Lancaster, Pa. (*Pennsylvania School Journal*.)

The Mission of the Elementary School. An Address to the National Superintendents' Convention, Chattanooga, Tenn., February 22, 1898. (*Volume of Proceedings.*)

Observation—Applied to History. An Address before the National Herbart Society of 1898. (*Year Book* for 1898. Chicago, Ill.)

Juniata Bible Lectures. Delivered to the Bible School of Juniata College, Huntingdon, Pa. (196 pp.)

A Geography of Pennsylvania. (American Book Company, N. Y.)

CALVERT, PHILIP P.

Specimens of Natural History in the Foreign Mails. (*Entomological News*, Philadelphia, February, 1898, pp. 45-46.)

Odonata. A Synonym and the Bearing of Its Discovery on the Classification of Agrion. (*L. c.*, March, 1898, pp. 72-73.)

Odonata. The First Filling of the Tracheæ with Air. (*L. c.* March, 1898, pp. 73.)

Odonata from the Indian Ocean, and from Kashmir. Collected by W. L. ABBOTT. (*Proceedings of the Academy of Natural Sciences of Philadelphia*, 1898, pp. 141-154, 7 figs.)

CHEYNEY, EDWARD P.

English Constitutional Documents. *Translations and Reprints from the Original Sources of European History.* Vol. I, No. 6. (Second Edition.)

Documents Illustrative of Feudalism. *Translations and Reprints from the Original Sources of European History.* Vol. IV, No. 3.

Review of Maitland's Domesday and Beyond. (*American Law Quarterly Review.*)

CHILD, CLARENCE G.

King or Cony? (*Modern Language Notes*, January, 1898.)

The Fifteenth Annual Meeting of the Modern Language Association of America. (*Ibid.*, March, 1898.)

CLARKE, HUGH A.

Harmony.

CONKLIN, EDWIN G.

The Aster in Fertilization and Cleavage. (*Science.*)

Cleavage and Differentiation. (*Wood's Holl Lectures*, 1897.)

DALAND, JUDSON.

Article on Haematokrit. (For new edition of KEATING'S *Encyclopædia.*)

Menière's Disease. With JAMES M. BROWN. (*Journal of the American Medical Association*, February 26, 1898.)

Observations Tending to Show that Tincture of Digitalis is Inert in Tablet Form. (*Medical and Surgical Reporter*, December 4, 1897.)

DAVIS, GWILYNN G.

The Technique of Pirogoff's Amputation of the Foot. (*University Medical Magazine*, October, 1897.)

The Operative Treatment of Hemorrhoids. (*Therapeutic Gazette*, December, 1897.)

Surgery in the Orthopaedic Hospital; Non-Operative Cases. (*Philadelphia Medical Journal*, January, 1898.)

Resection of the Knee Joint. (*University Medical Magazine*, March, 1898.)

Complete Removal of the Penis and Testicles for Malignant Disease. (*Annals of Surgery*, February, 1898.)

DOOLITTLE, CHARLES L.

The Constant of Aberration. From Zenith Telescope Observations at the Flower Astronomical Observatory. (*Astronomical Journal*, No. 428.)

DOOLITTLE, ERIC.

The Secular Perturbations of Venus arising from the Action of Mars. (*Astronomical Journal*, No. 418.)

The Secular Perturbations of Venus arising from the Action of the Earth. (*Astronomical Journal*, No. 428.)

The Secular Perturbations of Venus arising from the Action of Jupiter. (*Astronomical Journal*, No. 435.)

DORLAND, W. A. NEWMAN.

Section on Obstetrics. (*American Year Book of Medicine and Surgery*, 1898. 73 pp.)

Section on Gynaecology. (*American Year Book of Medicine and Surgery*, 1898. 84 pp.)

Repeated Extra-uterine Pregnancy. (*American Journal of Obstetrics*, April, 1898.)

DUHRING, LOUIS A.

Cutaneous Medicine; a Systematic Treatise on the Diseases of the Skin. (Part III. 1897.)

DULLES, CHARLES W.

The University of Pennsylvania and Its Medical Department. (*University Medical Magazine*, May, 1897.)

Comforting Facts About Consumption. (*Medical Age*, June 10, 1897.)

Report on Hydrophobia. (*N. Y. Medical Record*, June 26, 1897.)

Consumption Not Contagious. (*Transactions of the College of Physicians of Philadelphia*, June 2, 1897.)

Rabies. (Stenographer's Report of *ex tempore* remarks made before the Clinical Society of Maryland, February 5, 1897.) (*Maryland Medical Journal*, October 16, 1897.)

EASBY, WILLIAM, JR.

Report on a Sewage System for the Borough of Media, Pennsylvania. By WILLIAM EASBY, JR., Designing Engineer.

EDSALL, DAVID L.

Clinical Estimation of Hydrochloric Acid in the Stomach Contents. (*University Medical Magazine*, August, 1897.)

Note on the Gastric Conditions in Anæmias. (*Philadelphia Medical Journal*, January, 1898.)

Dissociation of Sensation of the Syringomyelic Type in Potts' Disease. (*Journal Nervous and Mental Diseases*, April, 1898.)

FALKNER, ROLAND P.

Note on the Monetary Situation. Appended to No. 13, Series in Political Economy and Public Law, *Publications of the University of Pennsylvania*. (See J. F. JOHNSON.)

Note on Economic Aspect of Insurance. Appended to Discussion of the Economic Aspects of Insurance. By L. G. FOUSE and others, in *Publications of the American Academy of Political and Social Science*, No. 218.

FRAZIER, CHARLES H.

The Physiological Effects of Hot Air in the Treatment of Diseased Joints. (*Annals of Surgery*, 1897.)

GRAYSON, CHARLES P.

Translation of Grünwald's Diseases of the Larynx.

GRIFFITH, J. P. CROZER.

The Pasteurization of Milk. (*Therapeutic Gazette*, May, 1897.)

Two Cases of Unilateral Tremor Occurring in Children. (*Archives of Pediatrics*, November, 1897; also, *Transactions American Pediatric Society*, 1897.)

Retro-Oesophageal Abscess. (*University Medical Magazine*, January, 1898; also in *Transactions American Pediatric Society*, 1897.)

Types of Oedema in Infancy and Childhood. (*Medical News*, October, 1897; also *Transactions Association American Physicians*, 1897.)

Idiopathic Osteopetrosis (Magilitas Ossium) in Infancy and Childhood. (*American Journal Medicine*, April, 1897; also *Transactions Association American Physicians*, 1896.)

Fetal Typhoid and the Widal Reaction; Report of a Case. (*Medical News*, May, 1897.)

Pneumonia in Children. (*Medical News*, December, 1896.)

GUDEMAN, ALFRED.

The Vita Agricolae of Tacitus. Biography in *Proceedings of American Philological Association*, Vol. XXVIII (1898), pp. XLVIII-LIII.

Critical Notes to the Agricola of Tacitus. (*Classical Review*, October, 1897, pp. 325-332.)

GUITERAS, JOHN.

Yellow Fever Epidemic of 1897. (*Public Health Reports*, November, 1897.)

Symptomatology and Course of Yellow Fever. (*University Medical Magazine*, April, 1898.)

HAMILL, SAMUEL M.

Glandular Fever. (*University Medical Magazine*, June, 1897.)

The Condition of the Salivary Digestion in Anæmia. (*Philadelphia Medical Journal*, January 22, 1898.)

Auto-Intoxication, with the Report of a Case in an Infant of Fifteen Months. (*Archives of Pediatrics*, May, 1898.)

A Case of Aneurism of the Arch of the Aorta. (*International Medical Magazine*, May, 1898.)

HAND, ALFRED, Jr.

Tuberculosis of the Myocardium. (*Archives of Pediatrics*, March, 1898.)

A Contribution to the Therapeutics of Enuresis. (*Pediatrics*, April, 1898.)

HARSHBERGER, JOHN W.

The Native Dahlias of Mexico. (*Science*, N. S. VI, p. 908, December 19, 1897.)

The Vegetation of the Yellowstone Hot Springs. (*American Journal of Pharmacy*, Vol. 69, pp. 625, December, 1897.)

Water Storage and Conduction in Senecio praecox. (From *Mexico Botanical Gazette*, XXV, pp. 116, February, 1898.) [Abstract of a paper read at Cornell University, December, 1897.]

A Review of Our Knowledge of Phyto-Bezoars. (*Journal of Comparative Medicine and Veterinary Archives*, XIX, pp. 143, March, 1898.)

A Few Ecological Notes. (*Asa Gray Bulletin*, April, 1898.)

A Mexican Tropical Botanic Laboratory. (*Botanical Gazette*, May, 1898.)

Home and School Window Gardens. (*Education*, XVIII, p. 555, May, 1898.)

HARTE, RICHARD H.

Ligation of the Innominate Artery for Hemorrhage, with the Report of a Case. (*Annals of Surgery*, October, 1897.)

Epiphysial Separation of the Head of the Femur, with the Report of a Case. (*Transactions American Surgical Association*, 1897.)

Hari Kari, with the Report of a Successful Case. (*Annals of Surgery*, 1898.)

HARTZELL, MILTON B.

A Case of Impetigo Herpetiformis. (*Journal of Cutaneous and Genito-Urinary Diseases*, November, 1897.)

Epithelioma (Rodent Ulcer) in a Boy of Fourteen. (*New York Medical Journal*, March 5, 1898.)

Lichen Ruber; Lichen Planus; Lichen Scrofulosorum; Lichen Pilaris; Pityriasis Rubra Pilaris; Dermatitis Factitia; Dermatitis, Gangraenosa Infantum; Multiple Gangrene of Adults; Raynaud's Disease; Diabetic Gangrene. (*An American Text-Book of Genito-Urinary Diseases, Syphilis, and Diseases of the Skin*. By Bangs & Hardaway, 1898.)

Three Cases of Tuberculosis Cutis Verrucosa. (*Journal of the American Medical Association*, April 16, 1898.)

HIRST, BARTON COOKE.

The Comparative Value of Collio-Hysterectomy and Collio-Hysterotomy in Cases Requiring Cæsarian Section. (*American Journal of Obstetrics*, May, 1898.)

HILPRECHT, HERMANN V.

Business Documents of Murashu Sons, Philadelphia, 1898 (together with A. T. CLAY), being Vol. IX. of HILPRECHT, *The Babylonian Expedition of the University of Pennsylvania*, Series A: Cuneiform Texts.

Proper Names of the Time of King Artaxerxes I. (Philadelphia, 1898.)

Notes on Recently Found Nippur Tablets. (*Palestine Exploration Fund Quarterly Statement*, January, 1898, pp. 54*f.*)

Babylonian and Egyptian Civilizations; which Earlier? (*Sunday School Times*, April 23, 1898.)

JASTROW, MORRIS, JR.

Review of Maspero's Struggle of Nations. (*Citizen*, October, 1897.)

Review of Peter's Nippur. (*Citizen*, February, 1898.)

The Modern Attitude towards Religion. (*Ethical Series*, Vol. III, No. 1.)

The Original Character of the Hebrew Sabbath. Paper read before the Eleventh International Congress of Orientalists, Paris, September 8, 1897; and before the American Philosophical Society, December 17, 1897. (Published in the *American Journal of Theology*, April, 1898.)

The New Babylonian Version of the Account of the Deluge. (Two articles in the *Independent*, February 10 and 17, 1898.)

Islamism. (*Progress*, Vol. III, No. 6.)

Shualu. (*American Journal of Semitic Languages*. April, 1898.)

JOHNSON, EMORY R.

Early History of the United States Consular Service, 1776-1792. (*Political Science Quarterly*, March, 1898, pp. 22.)

Brotherhood Relief and Insurance of Railway Employees. (*Bulletin of United States Department of Labor*. May, 1898, pp. 50.)

JOHNSON, JOSEPH FRENCH.

A Discussion of the Interrogatories of the Monetary Commission of the Indianapolis Convention. With Supplementary Suggestions by R. P. FALKNER, H. R. SEAGER, and S. M. LINDSAY. No. 13, in Series in Political Economy and Public Law, *Publications of the University of Pennsylvania*.

JOPSON, JOHN H.

Two Cases of Congenital Elephantiasis. (*Archives of Pediatrics*, March 1898.)

KIRBY, ELLWOOD R.

Cysts of the Epididymis and their Relation to Hydrocele. (*University Medical Magazine*, January, 1898.)

Thermotherapy, or the Hot-Air Treatment; its Uses and Possibilities. (*Therapeutic Gazette*, November, 1897.)

KELLY, ALOYSIUS O. J.

Translation of An Atlas of Legal Medicine by Hofmann. With
DR. FREDERICK PETERSON.

LEWIS, WILLIAM DRAPER.

Strikes and Courts of Equity. (*American Law Register and Review for 1898*, Vol. 46.)

The Lease of the Philadelphia Gas Works. (*Quarterly Journal of Economics*, Vol. XII.)

LEARNED, M. D.

From Francis Daniel Pastorius' Bee-Hive or "Bee-Stock." (*Americana Germanica*, I, 4, pp. 67-110.)

Review. B. J. Vos' Diction and Rime-Technic in the Works of Hartman von Aue. (*Ibid.*, I, 4, 115.)

Review. Sanford H. Cobb's The Story of the Palatines. An Episode in Colonial History. (*The American Historical Review*, III, 3, pp. 553-555.)

Editor of *Americana Germanica*; a Quarterly, devoted to the Comparative Study of the Literary, Linguistic and other Cultural Relations of Germany and America.

LEONARD, CHARLES L.

The Application of the Roentgen Ray to Medical Diagnosis. (*Journal of the American Medical Association*, December, 1897.)

The Influence of the X-Ray Method of Diagnosis upon the Treatment of Fractures. (*Therapeutic Gazette*, March, 1898.)

The Value of the Roentgen Ray as a Means of Surgical Diagnosis. (*University Medical Magazine*, April, 1898.)

Methods of Precision in Locating Foreign Bodies in the Head by Means of the Roentgen Rays, with Special Reference to Foreign Bodies in the Eye. (*Annals of Ophthalmology*, April, 1898.)

Report of a Case of Localization of a Fragment of Babbitt Metal in the Eyeball by Means of the X-Ray. (*Philadelphia Medical Journal*, April, 1898.)

Surgical Progress Abstracts. (*The American Journal of the Medical Sciences*, monthly.)

LINDSAY, SAMUEL McCUNE.

Note on the Monetary Situation. Appended to No. 13, Series in Political Economy and Public Law, *Publications of the University of Pennsylvania*. (See J. F. JOHNSON.)

Review. Spencer's Principles of Sociology. (*Citizen*, October, 1897.)

Review. *Nash's Genesis of the Social Conscience.* (*Citizen*, December, 1897.)

Substitutes for Primaries. (*New York Evening Post*, January 21, 1898.)

Sociological Notes. (*Annals of the American Academy of Political and Social Science*, September, November, 1897, and January, March, and May, 1898.)

Sviluppo e importanza delle imprese municipali di speculazione. (*Revista di Sociologia*, January, February, 1898.)

Vacant Lot Cultivation. (*Charities Review*, April, 1898.)

MARBURG, EDGAR.

Report on a Steel Arch Bridge across Rock Creek, on the line of Massachusetts Avenue Extended, Washington, D. C., designed by EDGAR MARBURG, Consulting Engineer, forming part of House Document, No. 163, Fifty-fifth Congress, Second Session.

MERCER, HENRY C.

The Survival of the Mediæval Art of Illuminative Writing Among Pennsylvania Germans. (3 half-tones, 2 cuts. 14 pp. *American Philosophical Society Publications*.) Contributions to American History of the Bucks County Historical Society, No. 2.

Cave Hunting in Yucatan. (6 half-tones, 25 pp. *Technology Quarterly*, December, 1897. Vol. X, No. 4. Boston, Mass.)

Potter's Wheel in Yucatan. (5 pp., 2 half-tones. *Bulletin of Free Museum of Science and Art, University of Pennsylvania*, No. 2, Vol. I.)

The Decorated Stove Plates of Durham. Contributions to American History by the Bucks County Historical Society. (No. 3, 3 pp., double column *Intelligencer Press*, Doylestown.)

Light and Fire Making. (29 pp., 45 half-tones. McCalla & Co.) Contributions to American History by the Bucks County Historical Society, No. 4.

MITCHELL, JOHN K.

Fracture of Lateral Vertebral Process; Resulting Sciatic and Other Pains; Operative Cure. (*University Medical Magazine*, June, 1897.)

Headache with Visual Hallucination. (*Journal of Nervous and Mental Disease*, October, 1897.)

False Neuroma of External Popliteal Nerve. (*University Medical Magazine*, November, 1897.)

Seborrhoea Nigricans, an Unusual Hysterical Disorder. (*Philadelphia Medical Journal*, 1898.)

A Case of Transverse Myelitis, with an Unusual Form of Descending Degeneration in the Posterior Columns. With J. H. WALLACE RHEIN, M. D. (*Journal of the American Medical Association*, April 9, 1898.)

A Case of Primary Combined Column Disease. With J. H. WALLACE RHEIN, M. D. (*Journal of the American Medical Association*, April 16, 1898.)

MILLS, CHARLES K.

Preliminary Report, Clinical and Pathological, of a Case of Progressive Dementia. With MARY A. SCHIVELY. (*Proceedings of the American Medico-Psychological Association*, 1897.)

Forced Movements, with the Report of a Case. With WILLIAM G. SPILLER. (Ninth Annual Report of the New Jersey Training School for Feeble-Minded Children, 1897.)

The Nervous System and Its Diseases. Diseases of the Brain and Cranial Nerves, with a General Introduction on the Study and Treatment of Nervous Diseases. (1056 pages, with 459 illustrations. J. B. Lippincott Company, 1898.)

Article on Occupation Neuroses—Affections of the Neuro-Muscular Apparatus Due to Special Occupations. (In *A System of Practical Medicine by American Authors*. Edited by A. L. LOOMIS, M. D., and W. G. THOMPSON, M. D. Philadelphia, Lea Bros. & Co.)

Introduction to the Study of Nervous Diseases in Children. (For the Supplementary Volume of KEATING'S *Cyclopaedia of the Diseases of Children*. J. B. Lippincott Company, Phila.)

History of Medical Jurisprudence in Philadelphia. (A Chapter in the *Standard History of the Medical Profession in Philadelphia*. Edited by FRED. P. HENRY, A. M., M. D. Goodspeed Bros., Chicago, 1897.)

MILLER, A. W.

The Pride of the Plantagenets. (*Public Ledger*, June, 1896.)

Christmas Greens. (*Ibid.*, December, 1897.)

Painter's Arboretum. (*Ibid.*, July 13, 1897.)

List of Plants in Bartram's Garden. (*Ibid.*, December 18, 1897.)

Flora of Bushkill Falls. (*Ibid.*, November 25, 1897.)

Chocolate Tree. (*Ibid.*, January 13, 1898.)

Ceylon Cinnamon. (*Ibid.*, January 29, 1898.)

Excursion to Pocono. (*Ibid.*, August 25, 1896.)

MORTON, SAMUEL W.

Multiple Paralysis Following Measles. (*University Medical Magazine*, August 1897.)

MUNRO, DANA C.

Luther's Influence on Literature. (*Chautauquan*, ——, 1897.)

Urban and the Crusaders. *Translations and Reprints from the Original Sources of European History.* Vol. I, No. 2. (Third Edition.)

MUSSER, JOHN H.

Renal Calculus. (*Philadelphia Medical Journal*, April 16, 1898.)

On the Disappearance of Endocardial Murmurs of Organic Origin. (*British Medical Journal*, October 16, 1897.)

A Clinical Study of Widal's Serum Diagnosis of Typhoid Fever. (*American Medical Association Journal*, 1897.)

Angina Pectoris: Its Relation to Dilatation of the Heart. (*Transactions of the Association of American Physicians*, 1897.)

On Myocarditis. (*Pathological Society*, March, 1898.)

McKEE, JAMES H.

Functional Enuresis; its Nature and Treatment. (*University Medical Magazine*, December, 1897.)

McMASTER, JOHN BACH.

A School History of the United States. (*American Book Company*, N. Y., 1897.)

NEWBOLD, WILLIAM ROMAINE.

Demon Possession and Allied Themes. (*New World*, September, 1897; 21 pp.)

PACKARD, FREDERICK A.

The Signs and Symptoms of Aortic Aneurism. (*Medical and Surgical Reporter*, 1897.)

Trichinosis in the United States, with Report of a Case. (*Journal of American Medical Association*, July, 1897.)

A Case of Sarcoma of the Lung, with Symptoms of Addison's Disease from Involvement of the Supra-renal Capsules, with J. DUTTON STEELE. (*Medical News*, September, 1897.)

Stricture of the Oesophagus Following Typhoid Fever. (*Philadelphia Medical Journal*, February, 1898.)

The Prescribing of Diet in Private Practice. (*University Medical Magazine*, February, 1898.)

The Treatment of Acute Intussusception in Young Children from the Standpoint of the Physician. (*Therapeutic Gazette*, March, 1898.)

Eight Cases of Malformation of the Hands and Feet. (*Archives of Pediatrics*, April, 1898.)

A Case of Tetanus followed by Recovery. (*Archives of Pediatrics*, February, 1898.)

Some Points in the Diagnosis and Treatment of Heart Disease. (*Maryland Medical Journal*, March, 1898.)

Pathology of the Blood-Vessels. (*Proceedings of the Pathological Society of Philadelphia*, March, 1898.)

Multiple Out-Growths from the Serous Surface of the Pleum. (*Proceedings of the Pathological Society of Philadelphia*, March, 1898.)

PEARCE, F. SAVARY.

A Study in Epilepsy. With DR. WHARTON SINKLER. (*Pennsylvania Medical Journal*, September, 1897.)

A Study of the Blind. (*International Medical Magazine*, March, 1898.)

A Case of Ataxic Paraplegia; Severe Pain and Muscular Spasms, followed by Blood Extravasations. (*University Medical Magazine*, May, 1898.)

PEPPER, WILLIAM.

Abrupt Onset in Typhoid Fever. With ALFRED STENGEL. (*Philadelphia Medical Journal*, January, 1898.)

POTTS, CHARLES S.

Two Cases of Progressive Neurotic Atrophy. (*University Medical Magazine*, February, 1898.)

RENNERT, HUGO A.

Review. New Books on Spain. (*Philadelphia Press*, April 3, 1898.)

Lazarillo de Tormes. Reprint of Ed. Burgos, 1554, by H. BUTLER CLARK, Oxford. London, 1897. (*Modern Language Notes*, May, 1898.)

RIESMAN, DAVID.

Primary Cancer of the Gall-Bladder. Extensive Secondary Involvement. (*Proceedings of the Pathological Society of Philadelphia*, October 28, 1897.)

Cancer of the Stomach. (*Ibid.*, December 1, 1897.)

Congenital Inguinal Hernia. (*Ibid.*, January 15, 1898.)

- Gangrene of Lung; Tumor of Infundibulum; Anomaly of Basilar Artery.** (*Ibid.*, January 15, 1898.)
- A Case of Carcinoma of the Rectum, with Miliary Carcinosis of the Peritoneum.** (*Ibid.*, February 15, 1898.)
- Two Cases of Diphtheria; One from Laboratory Infection, and One in an Infant Eleven Days Old.** (*The Philadelphia Medical Journal*, March 5, 1898.)
- "Trigger-Finger" (Digitus Recellens) Associated with Acroparesthesia.** (*The Philadelphia Polyclinic*, March 26, 1898.)
- Article "Pathology."** (In the *American Year Book of Medicine and Surgery*, 1898.)
- Editorial on Liquid Air.** (*The Philadelphia Polyclinic*, April 2, 1898.)

ROWE, LEO S.

- Taxation in Glasgow and English Cities.** (*City and State*, January 13, 1898.)
- The Municipality and the Gas-Supply.** (Article in *Annals of American Academy of Political and Social Science*, May, 1898.)
- Review. Goodnow's Municipal Problems.** (*Annals*, March, 1898.)
- Notes on Municipal Government.** (*Annals of American Academy*, September, November, 1897; January, March, and May, 1898.)

SEAGER, HENRY R.

- Note on the Monetary Situation.** Appended to No. 13, Series in Political Economy and Public Law, *Publications of the University of Pennsylvania*. (See J. F. JOHNSON.)
- Reviews and Book Notes.** (*Annals of American Academy*, September and November, 1897; January, March, and May, 1898.)
- The Teaching of Economic History and of Political Economy.** (*Publications of the American Economic Association*, February, 1898.)
- The Consumers' League.** (*Bulletin of the American Academy*, March, 1898.)

SCHELLING, FELIX E.

- Ben Jonson and the Classical School.** (Publications of the Modern Language Association, March, 1878.)
- Review. Shakespeare's London; a Study of London in the Reign of Queen Elizabeth.** By T. FAIRMAN ORDISH. (*Citizen*, December, 1897.)
- Review. The Diary of Master William Silence; a Study of Shakespeare and Elizabethan Sport.** By D. H. MADDEN. (*Citizen*, February, 1898.)

SCHLEIF, WILLIAM.

Administration of Drugs. (April, 1898.)

SCHREINER, EDWARD R.

Arsenical Neuritis following the Treatment of Chorea with Fowler's Solution. (*Annals of Gynaecology and Pediatry*, February, 1898.)

A Diet List and System of Dietaries. (P. Blakiston, Son & Co. Philadelphia.)

SEELER, EDGAR V.

The Tennessee Centennial Exposition. (*Architectural Review*, Vol. V, No. 2.)

SHUMWAY, D. B.

The Verb in Thomas Murner II. (*Americana Germanica*, I, 4, pp. 1-30.)

SPILLER, WILLIAM G.

Case of Meningo-myelitis Resembling in Some Respects Paralysis, with Especial Reference to Tubercular Meningo-myelitis. (*Journal American Medical Association*, 1897.)

Microscopic Study of the Spinal Cord in Two Cases of Potts' Disease. (*Johns Hopkins Hospital Bulletin*, 1898.)

On Neuromuscular Bundles. (*Journal of Nervous and Mental Diseases*, September, 1897.)

STEELE, J. DUTTON.

A Case of Sarcoma of the Lung, with Symptoms of Addison's Disease from Involvement of the Supra-renal Capsules. With FRED. A. PACKARD, M. D. (*Medical News*, September, 1897.)

A Review of the Literature of Koch's Tuberculin. (*International Medical Magazine*, December, 1897.)

The Myocardium. With DR. JOHN H. MUSSER. (*Proceedings of the Pathological Society of Philadelphia*, March, 1898.)

STENGEL, ALFRED.

Delayed Resolution in Pneumonia and its Treatment. (*Therapeutic Gazette*, February, 1898.)

Pseudolenkaemia Infantum. (*University Medical Magazine*, April, 1898.)

SWAN, JOHN M.

Antitoxin; Trained Nurse. (December, 1897.)

A Manual of Human Anatomy. Arranged for second year students. (Philadelphia, 1898.)

TAYLOR, A. E.

Beitrage zur Verwerthung der Kruger-Wulffschen Methode zur Bestimmung der alloxur Korper in Hern. (*Centralbl. für Innere Med.*, No. 34, 1897.)

The Tufnell Treatment and the Calcium Salts in the Treatment of Aneurism. (*Journal of Exper. Med.*, April, 1898.)

THORPE, FRANCIS N.

American Contributions to Civilization. (*Philadelphia Press*, February 9, 1898.)

Choosing a College Course. (*Philadelphia Press*, February 20, 1898.)

Story's Building of the British Empire. (*Philadelphia Press*, March 27, 1898.)

Jefferson in Philadelphia. (*Philadelphia Press*, April 10, 1898.)

Our Treaty Relations with Spain. (*Philadelphia Press*, April 10, 1898.)

A Constitutional History of the American People. Two vols., Svo. (Harper & Brothers, 1898.)

TYSON, JAMES.

Note on the Proper Use of Terms to Indicate Myocardial Change. Read before the British Medical Association at its meeting in Montreal, Can., September, 1897. (*British Medical Journal*, October 30, 1897.)

Abnormalities of Form and Position of the Kidney: Renal Adequacy. In Vol. 2, of the *American System of Practice of Medicine*. Edited by LOOMIS & THOMPSON. (Lea Bros. & Co., Philadelphia, 1881.)

Haematuria. A Clinical Lecture delivered at the University of Pennsylvania. (*International Medical Clinics*, Vol. 3, 7th series, 1897.)

(1) **Report of a Case of Hypertrophic or Biliary Cirrhosis, with Comments on its Etiology.** (2) **A Case of Persistent Cupitent Râle.** (*Virginia Medical Semi-Monthly*, October 22, 1897.)

Diabetes Mellitus. A contribution to a discussion at the meeting of the British Medical Association in Montreal, Can., September 3, 1897. (*British Medical Journal*, October 16, 1897.)

On the Treatment of Obstinate Dropsies. A paper read before the Blair County Medical Society, October 28, 1897. (*Therapeutic Gazette*, January 15, 1898.)

The Selection of Diet for the Sick. Remarks made at the Meeting of the Section on General Medicine, College of Physicians, November 8, 1897.

Address of the Retiring President of the Philadelphia County Medical Society. (Read February 9, 1898. *Philadelphia Poly-clinic*, February 19, 1898.)

Physical Diagnosis. Third Edition. (P. Blakiston, Son & Co., 1898.)

WEBB, WALTER L.

The Mass Curve in Earthwork Computations: Paper read before the Engineers' Club of Philadelphia in November, 1897. Published in *Proceedings of the Engineers' Club* in January, 1898. Printed by special permission in *Rail Road Gazette*, December 17, 1897.

WESTCOTT, THOMPSON S.

A Case of Influenza with Persistent Respiratory Failure in an Infant of Four Weeks. (*Archives of Pediatrics*, October, 1897.)

A Simple Method of Calculating the Proportions of Cream and Whole Milk Required to Make any Percentage Formula for Home Modification, (*Archives of Pediatrics*, January, 1898.)

A Further Simplification of the Above Method. (*Archives of Pediatrics*, February, 1898.)

WHITCOMB, MERRICK.

Typical Cahiers of 1789. (*Translations and Reprints from the Original Sources of European History*. Vol. IV, No. 5.)

WILLARD, DE FOREST.

Address at the Opening of the Agnew Memorial Pavilion, University Hospital. (Pamphlet.)

Special Paraplegia. (*Journal of Nervous and Mental Diseases*.)

WITMER, A. FERREE.

Endothelioma of the Spinal Meninges. (*Proceedings of the Pathological Society of Philadelphia*, October, 1897.)

Types of Insanity. (*Philadelphia Polyclinic*, October, 1897.)

A Case of Athromegaly. (*International Medical Magazine*, January, 1898.)

The Pharmacist's Life from a Mental Standpoint. (*Alumni Report of the Philadelphia College of Pharmacy*, April, 1898.)

WOOD, ALFRED C.

Article on Diseases of the Prostate; in conjunction with J. WILLIAM WHITE, M. D., in *An American Text-Book of Genito-Urinary Diseases, Syphilis and Diseases of the Skin*, March, 1898.

WOOD, HORATIO C.

Therapeutics: Its Principles and Practice. (Tenth Edition.)

Clinical Note on "Repeating." (*University Medical Magazine*, December, 1897.)

WOOD, HORATIO C., Jr.

Notes on the Elimination of Strontium. (*American Journal of Physiology*, January, 1898.)

YOUNG, JAMES K.

The Operative Treatment of Lumbar (Potts') Abscess. (*Medical News*, November 20, 1897.)

Accurate Measurements for Scoliosis. (*University Medical Magazine*, February, 1898.)

Physical Development. With JOSEPH M. SPELLISSY. (Supplement to Keating's *Encyclopædia of Diseases of Children*.)

YOUNG, JAMES T.

Administrative Centralization and Decentralization in France.

(*Annals of the American Academy*, January, 1898.)

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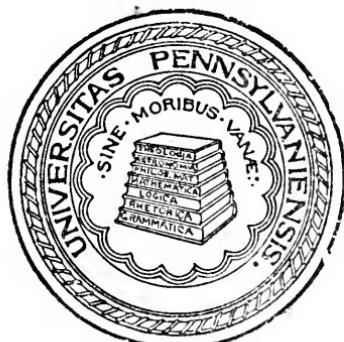
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JUNE EIGHTH, 1898



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Ellis Edgar Willits Given	William Hupp Sands

Prizes

1. THE B. B. COMEGYS PRIZES, one for the best special examination in Latin required for admission to the courses in Arts and Science. To OSWALD THOMPSON ALLIS; Honorable Mention of HERBERT ADAMS GIBBONS; and one for the best special examination in Greek required for admission to the same courses. To HERBERT ADAMS GIBBONS; Honorable Mention of THOMAS FRANCIS CADWALADER.

2. THE EUGENE DELANO PRIZE, for the best examination in the French and German required for entrance to College. To WILLIAM PAUL O'NEILL.

3. A prize, offered by the CLASS OF 1880, for the best examination in Mathematics, by a candidate for admission to the courses in Arts and Science. To LUCIUS FISHER CURTIS.

I.

THE FACULTY PRIZES.

1. A prize for the best Essay in Intellectual and Moral Philosophy by a member of the Senior Class. Subject: *The Moral Philosophy of Adam Smith as related to that of Hume.* To JASPER YEATES BRINTON.

2. A prize for the best examination by a member of the Freshman Class in Greek Prose Composition with the Accents. To THOMAS FRANCIS CADWALADER; Honorable Mention of WILFRED BORN VOGT and FRANK BROOKE EVANS, JR.

3. A prize to a member of the Senior Class, for the most meritorious work in the German Language and Literature over and above the regular course. Subject: *Lessing's "Litteraturbriefe."* (Written in German.) To JOHN LOUIS HANEY.

4. A prize to a member of the Senior Class, for the most meritorious work in the French Language and Literature over and above the regular course. Subject: "*Le Voyage de Charlemagne à Jérusalem.*" To ABRAHAM S. WOLF ROSENBACH.

5. A first prize and a second prize for the best examination on the Lectures on Quaternions, given to the Voluntary Junior Class. To HENRY WALTER JONES and RALPH CHAMBERS STUART, respectively.

6. A prize for the best Essay by a member of the Junior Class. Subject: *The Life and Writings of Andrew Marvell.* To CHARLES THOMAS MITCHELL; with Honorable Mention of HORACE STERN and FREDERICK DREW BOND.

7. A first prize and a second prize for the best Declamation by a member of the Sophomore Class, the contest being open to the public. To ALLISON GAW and RALPH NEWTON KELLAM, respectively.

8. A first prize and a second prize for the best and second best preparations illustrating the anatomy of any vegetable. To HARRIET BOEWIG and ANNIE BELL SARGENT, respectively ; with Honorable Mention of HELEN TAYLOR HIGGINS and BLANCHE GARDNER.

9. A first prize and a second prize for the best and second best preparations illustrating the anatomy or embryology of any animal. To LOUISE HORTENSE SNOWDEN and ANNIE BELL SARGENT, respectively ; with Honorable Mention of HELEN TAYLOR HIGGINS and AMELIA C. SMITH.

10. A prize to the member of the Sophomore Class who shall pass the best special examination in sight reading of Latin. To HAROLD HARRISON TRYON ; with Honorable Mention of STANLEY FOLZ and CHARLES JASTROW MENDELSONH.

11. A prize to the member of the Sophomore Class who shall pass the best special examination in sight reading of Greek. To CHARLES JASTROW MENDELSONH.

II.

THE SOCIETY OF THE ALUMNI PRIZES

I. THE HENRY REED PRIZE, founded by the Society of the Alumni, for the best English Essay by a member of the Senior Class. Subject : *The Poetry of Rudyard Kipling*. To JOHN LOUIS HANEY.

2. A prize for the best Latin Essay by a member of the Graduating Class. To ISADORE MERZBACHER and WALKER MOORE LEVETT, respectively.

3. A prize for the best, and a prize for the second best, Original Declamation by a member of the Junior Class. (Contest postponed until fall of '98.)

III. A prize founded by HENRY LABARRE JAYNE, of the class of 1879, for the best English Composition by a member of the Freshman Class. Subject : *The Poetry and Fiction of Robert Louis Stevenson*. To SAMUEL CROWTHER, JR. ; Honorable Mention of ETHEL COOKE.

IV. THE JOSEPH WARNER YARDLEY PRIZE, founded by the Class of 1877, in memory of their classmate, for the best Thesis in Political Economy by a member of the Senior Class. Subject : *The Policy of the United States Concerning Bounties upon Manufactures*. (Not awarded.)

V. A prize founded by D. VAN NOSTRAND, Esq., for the member of the Junior Class in Civil Engineering who attains the highest general average of scholarship. (Not awarded.)

VI. A prize founded by the PHI KAPPA SIGMA FRATERNITY, in honor of their founder, SAMUEL BROWN WYLIE MITCHELL, M. D., of the Class of 1852, for the best work in English Composition done during the year by a member of the Sophomore Class. To JOHN SEBASTIAN CONWAY ; with Honorable Mention of ALFRED BELDEN RICE and HARRIET BOEWIG.

VII. THE ASSAYERS AND MINERS GANGUE offers two prizes to members of the Post Senior Class. Equally to WILLIAM CLARENCE EBAUGH and CLAUDE MELNOTTE DUGAN, JR.

VIII. THE "SONS OF THE AMERICAN REVOLUTION" PRIZE, for the best Essay on some subject connected with the American Revolutionary History. (Not awarded.)

IX. THE GEORGE ALLEN MEMORIAL PRIZES, founded by JOSEPH G. ROSENGARTEN, Esq., for members of the Junior Class taking the Greek and Latin courses, as follows: In Greek, for the best examination on the *Oration of Demosthenes on the Crown*, read with a Professor as an extra subject, awarded to GERSHON BENEDICT LEVI; second prize to HENRY WILSON STAHLNECKER; and in Latin, for the best examination upon some work to be announced from year to year, to be read with the Professor of Classical Philology as an extra subject. To LEON DIX; second prize equally to HENRY WILSON STAHLNECKER and GEORGE WILLIAM BACON. The subject for 1897-8 was *Plautus' Mostellaria, and Terence's "Adelphi."*

X. THE "SONS OF THE REVOLUTION" PRIZE. A first prize and a second prize for the best and second best Essays on some subject connected with the Revolutionary Period in the State of Pennsylvania. To FRANCIS SIMS MCGRATH and FREDERICK LOGAN PAXSON, respectively

XI. A special prize offered by S. WEIR MITCHELL, M. D., LL. D., for the best Essay by a member of the Senior Class on the subject: *Shakespeare's Use of Thou and You*. To BURTON SCOTT EASTON; Honorable Mention of JOHN LOUIS HANEY.

XII. The Kappa Kappa Gamma Fraternity offers its Table at the Woods' Holl Laboratory, Mass., for the summer of 1898, as a prize to students in the courses in Biology. To ELMIRA LODOR.

XIII.

XIII. THE WILLIS TERRY PRIZES

1. A prize for the student of the Freshman Class who shall have the best standing for the year. To MEREDITH BRIGHT COLKET.

2. A prize for the student of the Sophomore Class who shall have the best standing for the year. To JULIUS STERN.

3. A prize for the student of the Junior Class who shall have the best standing for the year. To JAMES BLAINE DONALDSON.

4. A prize for the student of the Senior Class who shall have the best standing for the year. To JAMES RUSSELL SMITH.

5. A prize to a student of the Senior Class for special research and investigation upon a subject to be determined by the Committee on Economics, and relating to the financial and industrial conditions of the United States. Subject for 1898: *Railway Co operation: an Investigation of Railway Traffic Associations, and a Discussion of the Degree and Form of Co operation That Should Be Granted Competing Railways in the United States*. To CHARLES SOUDER LANGSTROTH; Honorable Mention of WILSON STILZ.

XIV. THE ROPES PRIZE. A prize offered by JOHN C. ROPES, Esq., for the best essay upon: *The Execution of Duc d'Enghien*. To SIDNEY BRADSHAW FAY, A. B., Harvard University.

XV. THE FRAZIER PRIZE. GEORGE H. FRAZIER, Esq., of the Class of 1887, offers annually a prize of a standard work in literature to be chosen by him, and of a value of one hundred dollars, to the student in the College of the University of Pennsylvania, who, being a member of the football team, baseball team, track team, or of the crew, shall attain the highest standing in scholarship. Awarded to WILLIAM NELSON MORICE.

XVI. W. W. FRAZIER, JR., PRIZES. A first prize and a second prize to be awarded in a public debating contest. Open to all students candidates for a degree. Awarded to (1) THOMAS RAEBURN WHITE (Law); (2) WILLIAM CRAIG JOHNSTON (Law); Honorable Mention of ROY WILSON WHITE (Law), and BERTRAM DELROY REARICK (Law).

XVII. PRIESTLEY CLUB PRIZE. In Chemistry. To WILLIAM CLARENCE EBAUGH.

XVIII. The Medal presented by JOSEPH WHARTON, Esq., to the member of the Senior Class in the Wharton School in good standing, who shall present the best thesis. To WILSON STILZ.

IN THE DEPARTMENT OF LAW

OWEN JOSEPHUS ROBERTS and ROY WILSON WHITE were elected Fellows of the Department of Law for one year.

THE FACULTY PRIZE, for the best written examination with all the Professors. In the Third-year Class, to OWEN JOSEPHUS ROBERTS; with Honorable Mention of ROY WILSON WHITE and ROGER ASHHURST. In the Second-year, equally to ALBERT LUDLOW CRAMER and BERTRAM DELROY REARICK; with Honorable Mention of HERMANN LUDWIG GROTE and DAVID NEWLIN FELL, JR. In the First-year, to CHARLES LOUIS MCKEEHAN; with Honorable Mention of CHARLES HENRY HOWSON.

THE P. PEMBERTON MORRIS PRIZE, for the best written examination in Evidence, Pleading and Practice at Law and in Equity. Equally to FREDERICK HORNICK WARNER and ROGER ASHHURST.

THE SHARSWOOD PRIZE, established by the Alumni of the Department of Law, for the best essay by a member of the Graduating Class, is awarded to OWEN JOSEPHUS ROBERTS, for his essay entitled, "*The Rights of Stockholders in the Management of a Corporation*."

THE MEREDITH PRIZE, for the second best essay, to ROY WILSON WHITE, for his essay entitled, "*Some Phases of Government Regulation of Contracts*." Honorable Mention to MARGARET CENTER KLINGELSMITH, for her essay entitled, "*The Tendency of the Common Law in Crimes and Torts*."

IN THE DEPARTMENT OF MEDICINE

THE ALUMNI MEDAL, with an accompanying Purse of Fifty Dollars, to the member of the Graduating Class who attains the highest general average in examination. To ELMER A DEAN.

The Prize of One Hundred Dollars, offered by a friend of the Department to the member of the Graduating Class who passes the best examination in Obstetrics. Equally to JAMES AVERY DRAPER, JR., and ALFRED JAMES OSTHEIMER, JR.

The Prize of an Obstetrical Forceps, offered by the Professor of Obstetrics to the member of the Graduating Class who furnishes the best report of a case of Obstetrics occurring in the University Maternity Hospital. To BREESE MORSE DICKINSON.

The Prize of Twenty-five Dollars, offered by a friend of the Department to the member of the Graduating Class who passes the best special examination in Therapeutics. To BERNARD KOHN; with Honorable Mention of CHARLES RANSOM REYNOLDS.

A Prize of a Surgical Pocket-case, offered by the Demonstrator of Anatomy, to the member of the Graduating Class who presents the best record of anomalies found in the anatomical rooms. To HENRY THOMAS WOODWARD.

The Prize of a copy of White and Martin's Genito-Urinary Surgery, offered by the Professor of Clinical Surgery to one member of each of the four Surgical Ward Class sections for reports of that service. To WM. HAMILTON JEFFERYS; with Honorable Mention of HARRY CLARKSON WESTERVELT and BREESE MORSE DICKINSON.

The Prize of a Surgical Pocket-case, offered by the Professor of Clinical Surgery for the best report of his clinics during the session. To LUCIUS CARTER KENNEDY; with Honorable Mention of HOWARD YARNALL PENNELL.

The two Prizes offered by the Demonstrator of Surgery are awarded as follows: A Surgical Pocket-case for proficiency in Fracture Dressings and in Operative Surgery. To FREDERICK FRALEY, JR.; with Honorable Mention of CHARLES RU LON PITTINGER and FRANKLIN LAFAYETTE WARREN. A Surgical Pocket-case to MACY BROOKS of the First-year Class, for proficiency in Bandaging; with Honorable Mention of EDWARD ARMIN SCHUMAN and Josie M. PORTUONDO.

THE ZENTMAYER PRIZE of a microscope for the best examination in Histology and Embryology. To OSCAR NOEL TORIAN.

The Prize of a Haemocytometer, offered by the Lecturer on Physical Diagnosis to the member of the First-year Class who presents the best report of his lectures on Physical Diagnosis. To ALVAN WOODWARD SHERRILL; with Honorable Mention of the reports of ARTHUR TRUMAN BOYER and JAMES RIESER GERHARD.

Honors.

The Prize of an Antiseptic Minor Operating Case, offered by the Clinical Professor of Orthopædic Surgery for the best practical work in Orthopædic Surgery, or for the best report of his clinic, or for an acceptable original design in apparatus. To NATHAN SHURTS YAWGER.

The Prize of an Axis-traction Obstetrical Forceps, offered by the Barton Cooke Hirst Obstetrical Society to the member of the Graduating Class who passes the best examination in Operative Obstetrics. To WILLIAM HAMILTON JEFFERYS.

IN THE DEPARTMENT OF VETERINARY MEDICINE

THE J. B. LIPPINCOTT PRIZE of one hundred dollars, awarded to the member of the Graduating Class who, in the three years spent in the Veterinary Department of the University, attains the highest general average in examinations. To JOHN JACOB REPP.

A Prize of an Ecraseur, offered by a friend of the Department to the member of the Second-year Class who passes the best examinations in Veterinary Anatomy. JOHN PHILIP MILLER.

Honors

IN THE COLLEGE

The following students are awarded HONORS for the work of the Senior year:

IN THE COURSE IN ARTS AND SCIENCE

Burton Scott Easton

Isadore Merzbacher
(Special Mention in Greek and Latin)

John Louis Haney
(Special Mention in English)

Frederick Logan Paxson

IN THE COURSE IN BIOLOGY

Louise Hortense Snowden

IN THE COURSE IN CHEMISTRY

William Clarence Ebaugh

IN THE COURSE IN FINANCE AND ECONOMY

Charles Souder Langstroth Wilson Stilz

IN THE COURSE IN MECHANICAL ENGINEERING

Thomas Craig Craig

Charles Collins Davis
(Special Mention—Post-Senior)

The following students are awarded HONORS for the work of the Sophomore year:

IN THE COURSE IN ARTS AND SCIENCE

Edward Ziegler Davis	Alfred Belden Rice
Stanley Folz	Harold Harrison Tryon

IN THE COURSE IN FINANCE AND ECONOMY

Walter Biddle Saul

IN THE COURSE IN SCIENCE AND TECHNOLOGY

William Hastings Easton

IN THE DEPARTMENT OF LAW

The following members of the graduating class are entitled to their diplomas *cum laude*:

Roger Ashurst	William Maul Measey
William Parson Beeber	Alfred Marcellus Mohr
William John Cooley	Owen Josephus Roberts
Charles Borromeo Joy	Louis Barclay Robinson
Ray Littleton	Frederick Hornick Warner
Francis Salisbury McIlhenny	Edward Waters Wells
Joseph Aloysius McKeon	Roy Wilson White

IN THE DEPARTMENT OF PHILOSOPHY
SENIOR FELLOWSHIPS

On the George Leib Harrison Foundation:

IN ENGLISH

Raymond Macdonald Alden, A.B. (Penna., 1894), Ph.D. (Penna., 1898).

IN AMERICAN HISTORY

Charles Henry Lincoln, A.B., A.M. (Howard, 1893, 1894), Ph.D. (Penna., 1896).

IN EUROPEAN HISTORY

Arthur Charles Howland, A.B. (Cornell, 1893), Ph.D. (Penna., 1897).

IN ECONOMICS

Walter Edward Weyl, Ph.B. (Penna., 1892), Ph.D. (Penna., 1897).

IN CHEMISTRY

Willett Lepley Hardin, B.S. (Buchtel, 1893), Ph.D. (Penna., 1896).

HONORARY FELLOWSHIPS**IN BOTANY**

Adelina Frances Schively, Cert. in Biol., Ph.D. (Penna., 1892, 1897).
 Samuel Christian Schmucker, A.B., S.B., A.M., S.M. (Muhlenberg,
 1882, 1884, 1885, 1891); Ph.D. (Penna., 1893).

FELLOWSHIPS

On the George Leib Harrison Foundation:

IN CLASSICAL LANGUAGES

Barclay White Bradley, A.B. (Penna., 1897).

IN SEMITIC LANGUAGES

Victor William Dippell, A.B. (Penna., 1895).

IN GERMANIC LANGUAGES

Martin Schütze (Universities of Freiburg in Baden and Rostock).

IN AMERICAN HISTORY

Herbert Eugene Bolton, B.L. (Wisconsin, 1895).

IN POLITICAL SCIENCE

William Harvey Allen, A.B. (Chicago, 1897).

IN ECONOMICS

Edwin Sherwood Meade, A.B. (De Pauw, 1896).

IN PEDAGOGY

Charles Dickens Nason, B.S. (Haverford, 1896).

IN CHEMISTRY

Alfred Tingle, B.Sc. (Aberdeen, 1896; London, 1897).

IN BIOLOGY

Jesse Moore Greenman, B.S. (Penna., 1893).

IN MATHEMATICS AND ASTRONOMY

Jeremiah Marcus Hadley, B.S. (Earlham, 1896).

The five unassigned **HARRISON FELLOWSHIPS** have been assigned for the year 1898-99, as follows :

ONE TO INDO-EUROPEAN PHILOLOGY

Lee Maltbie Dean, B.A. (Yale, 1896).

ONE TO GERMANIC LANGUAGES

Orlando Faulkland Lewis, A.B., A.M. (Tufts, 1895, 1897).

ONE TO AMERICAN HISTORY

Claude Halstead Van Tyne, A.B. (Michigan, 1896).

ONE TO SOCIOLOGY

George Ray Wicker, A.B. (Cornell, 1890).

ONE TO MATHEMATICS

John Brookie Faught, A.B. (Indiana, 1893).

On the Hector Tyndale Foundation:

IN PHYSICS

Morton Githens Lloyd, B.S. in M.E. (Penna., 1896).

Assignments of the **FELLOWSHIPS FOR WOMEN** have been made as follows:

On the Col. Joseph M. Bennett Foundation:

ONE TO CLASSICAL LANGUAGES

Mary Bartol, A.B., A.M. (Bucknell, 1894, 1895).

ONE TO EUROPEAN HISTORY

Caroline Colvin, A.B. (Indiana, 1893).

On the Frances Sergeant Pepper Foundation:

ONE TO PSYCHOLOGY

Anna Jane McKeag, A.B. (Wilson College, 1895).

On the Mrs. Bloomfield Moore Foundation:

ONE TO ENGLISH

Isabel Graves, Ph.B. (Wesleyan, 1891), A.M. (Western Reserve, 1897).

ONE TO CHEMISTRY

Lily Gavit Kollock, A.B. (Woman's College of Baltimore, 1895).

SCHOLARSHIPS

On the George Leib Harrison Foundation:

IN HISTORY AND ECONOMICS

Frederick Logan Paxson, B.S. (Penna., 1898).

IN CLASSICAL LANGUAGES

Isadore Merzbacher, A.B. (Penna., 1898).

IN MODERN LANGUAGES

Daniel Ernest Martell, A.B. (Penna., 1898).

IN HISTORY AND PHILOSOPHY

James Field Willard, B.S. (Penna., 1898).

IN MATHEMATICS AND PHYSICS

Burton Scott Easton, B.S. (Penna., 1898).

IN ENGLISH AND HISTORY

John Louis Haney, B.S. (Penna., 1898).

UNIVERSITY SERMON.

The Rev. Lyman Abbott, D. D.

Dr. Abbott took his text from Paul's Epistle to the Ephesians, vi. 10: "Finally, my brethren, be strong in the Lord, and in the power of His might." (The following is a stenographic abstract, published with the permission of Dr. Abbott.)

"I propose to speak to you of the secret of power, for the success of your lives will depend upon your understanding of power. Achievement depends on power, whether this achievement be physical, intellectual, moral or spiritual. The secret of civilization consists in our ability to lay hold of the forces in nature. The real reason why the American navy beats the Spanish navy is because we have learned to use God's projectiles, and they have not learned in Spain. We have been taught how to lay hold of the muscles of the Almighty, and this knowledge is the fulcrum by which God and man work together to elevate the human race. It is said that seven men by their labor can feed a thousand. This may or may not be true, but I think it can safely be said that through civilization 90 per cent of humanity are left free to serve the grander interests of humanity, lifting to higher levels their less fortunate fellow creatures. The secret of civilization is the power not ourselves that makes for material welfare.

"The secret of liberty is the power not ourselves that makes for justice. The old definition of law is, command addressed by a superior to an inferior—and the reason why he is superior is that he has power to inflict injury on his inferior. It means that the man will be injured if he disobeys. In other words, under the old basis the law was, might makes right; and that old basis of law is not consistent with liberty—it is despotism. The power of one man to compel another to do his bidding, caused by the

superior man's having authority to punish, is despotism. It is of no consequence whether that power is lodged in one or in many. The despotism of the French Revolution was as bad, if not worse, than Neroism.

"There are three axioms in this country's political economy. The first is, that there are infinite eternal laws of moral life, social life and industrial life, just as there are laws of material life. Our study of science teaches that all that man can do in nature is to discover unchanging laws that already exist. Similarly, all that our Congress can do is to discover and enforce laws already existing. We tried once in the case of slavery to make laws unto ourselves, contrary to God's eternal law, and we justly reaped the penalty. The one thing we have to do is to find out the unalterable laws of God and conform ourselves to them. The second axiom is, that there is an intelligence in man able to discover these laws. The third is, that there is a power in the conscience of man to enforce the law. When we find out what God's law is, we can trust to the conscience of man to enforce it. Our police are needed only for those who do not obey their own consciences.

"It is wonderful that when the 'Maine' exploded the American people did not explode also. The self-control and patience of our nation in waiting for the verdict of that Court of Inquiry is truly admirable. Their conscience held them in check. Why was peace no longer possible? Because the American people had consciences, which forced them to stand against oppression, despotism and starvation.

"The secret of liberty is self-government, and the secret of self-government is the capacity of man to ascertain the divine law and to enforce the divine law. Under such a system law is no longer a command addressed by a superior to an inferior; it is the act of a free people changing an intention into a deliberate and final purpose. It is the act of a free people saying, We will. The power that holds

this nation in order is the power of the voice of God speaking in the consciences of the people.

"I hope some of you young men have an ambition for politics. We need political leaders, and the great universities must furnish them to us. Men say to us : 'We must have bosses. How can we do without leaders?' Don't you know the difference between a leader and a boss? A leader is a man who sees the divine, eternal principles more clearly than his followers. He marches at the head of the procession. A boss is a man who marches at the rear, driving others on. If you are to do anything in this country in polities you must do it by a power not yourselves that makes for righteousness. You must do it by seeing the foundation principles of liberty, namely, the strength of righteousness enthroned in the consciences of men.

"It is on this power not ourselves that all progress depends. The reformers are always in a minority; they are an elect few. Matthew Arnold was right, Isaiah was right; they are a remnant. But Frederick Douglass was also right: 'One with God is a majority.' A handful of patriots are more than a match for George III; a handful of anti-slavery men are more than a match for a slaveocracy supported by State and acquiesced in by Church. The power of a Cavour in Italy, or a Gladstone in England, is the power of a moral law, and therefore of a moral Lawgiver really regnant in the community. Two and two do not always make four. They sometimes make a score; the other sixteen are the unknown quantity which overbalances all known quantities. A minority of reformers, leagued together for righteousness, is a majority.

"It is on this power not ourselves that personal character and personal attainment depend. There is an answer to the prayer of Tennyson: 'Oh, for a man to arise in me; that the man that I am may cease to be.' You cannot govern others unless you can govern yourself; nor lead

others unless you have a leader ; and this power of self-government, this power of leadership is a power outside yourself to be laid hold of and made your own. Even the young men shall utterly faint ; but they that wait on the Lord shall renew their strength ; they shall mount up as on eagles' wings ; they shall run and not be weary ; they shall walk and not faint.

" You are on eagles' wings and are looking into life. Now you are full of zeal, of hope, of enthusiasm ; but there will surely come a time when all the joy will seem to have gone, when you seem to have lived a life of failure and disappointment, when life seems not worth living for. This is the greatest thing of all, to keep on walking when roads are dry and dusty and when the day is hot—to run the race that is set before you without faltering. If you are worth anything the time will come when, like Elijah, you will sit down under a tree and say : ' Take away my life.' But blessed be you if at that time you can hear a still, small voice and raise up into health and strength again.

" What has this country a right to look for from its educated young men ? Knowledge and skill in the use of material things in life, that the rest may be lifted up ; wisdom to see what are the great, divine principles of social and industrial action and to formulate them into the permanent law of the nation of which you are a part ; vision to see the weakness and strength, the needs and resources of your country, and courage to lead. With God in your hearts, knowledge, skill, wisdom and courage will surely find their place.

COMMENCEMENT ADDRESS.

Hon. John B. McPherson.

When the University honored me with an invitation to deliver this address, the Provost accompanied the request with a statement that the University was anxious to discharge the full measure of its responsibility, and accordingly was seeking upon such public occasions as this to influence for good the aspirations and the purposes of American society. To me, and I am sure to you also, the statement is superfluous. I do no injustice to the earlier history of this great institution, when I say that in these latest years of her life she has shown in a peculiar degree a sense of obligation to her manifold trusts, a determination to be true to the best ideals of instruction and of university life, and a clear purpose to maintain a vital relation with the political and social movements of the time. If I did not fear to invade the privacy of a modest reserve, I should like to add that to no other cause is this advancement due so much as to the animating influence and example of her leader, whose generous and unselfish devotion to her interests cannot fail to be repaid by the affection of her sons and the respect and hearty support of his fellow-citizens. He has shown in conspicuous measure how serious a view of his obligations to society may be taken by an educated man, and how fruitful may be his conscientious endeavor. Scarcely any subject is of more importance to the nation than this, and often as one may hear of it he can hardly hear too much. Permit me for a few moments to turn your thoughts once more in this direction.

Here and elsewhere, the ranks of educated men are accustomed to receive their most notable accessions at this season of the year; and at such a time therefore it seems

especially fitting to couple with our cordial welcome the earnest reminder that every such recruit has by the mere fact of his education come under bonds to the society of which he forms a part. The commonest sense of gratitude should lead him to recognize the obligation, for he has received no inconsiderable part of his training as a free gift from the hands of those that are bound to him by no other tie than the tie of neighborhood or a common citizenship. This is obvious enough in the case of the public school, maintained by the contributions of rich and poor, of the wise and ignorant alike ; but, in much larger measure than is generally known, it is also true of private schools and of the greater institutions of learning. The men that administer the affairs of such a foundation know well how important—indeed, I may fairly say, how indispensable—a part is played by the benefactions of the generous. It is I think beyond controversy that no large school or college can continue to live—certainly, it cannot live at ease, or extend its borders—if such support be lacking ; and even among schools of less extensive range, the necessity for other help than comes from the pupils' fees becomes too frequently acute. In some degree, therefore, the least needy student receives his education as a charity ; but the fact should cause him no discomfort: it should rather serve as a wholesome reminder that if he profits by the gifts of his fellow-men he is bound to render them an adequate return, if not in kind, at least in sympathy and service.

Every graduate is a debtor also to the devoted and self-sacrificing instructors that have trained and moulded his powers and have brought him to the point of fitness for a wider life. They have given him freely much that cannot be reckoned in coin ; they have bestowed the results of unwearied labor and careful scholarship ; they have smoothed his path ; they have guided him past dangers and helped him over obstructions ; they have stimulated his ideals, strengthened his aptitudes, refined his taste ;

and in the vast majority of instances, they have conferred these blessings for a recompense so inadequate that—were it not for the priceless compensation that follows duty well performed and for the sustaining ardor of the intellectual life—no man would give his days to such a work. It becomes us to be grateful while we acknowledge how much we owe to the many benefactors that have made our education possible, and to the self-sacrificing scholars that have spent themselves in service too often unnoticed and unthanked.

But there is another reason than gratitude why the educated man is bound to employ his faculties for the good of his neighbor. I say his "neighbor," because the meaning of that word expands if we use it heartily, and reaches as far as the widest sympathy may extend. It is a reason especially binding in America, and of weightier importance now than ever before in our history. I mean, the likelihood that a self-centered attitude in the educated man will be looked upon as proof that he regards himself as belonging to a superior caste. It is no new thing to hear the charge, that culture tends towards selfishness. Stated thus nakedly, I deny the assertion; for the truest culture is the widest and the warmest. It leaves untouched no faculty or quality of the nature. It refines the taste by disclosing the essential truth that the highest beauty must be also pure and noble; it matures the judgment by bringing to the bar things sweet and just and honorable to be appraised; it strengthens the will by turning motive and volition toward the shining course of self-restraint. But there is a more contracted sense in which the charge has too much truth. The dilettante and the specialist do tend to be selfish in their several ways; a lazy or a narrow mind is selfish by the very implication of the words. The danger of narrowing is a well-known danger of special courses in a university curriculum, unless careful provision be made for an adequate base of preliminary general cul-

ture. And the risk is not confined to college walls; every man that is fond of the intellectual life stands in some peril of growing out of sympathy with the wider life about him. The delight to be found in books, and the joy in the deepening sense of mental power, may easily prove too attractive, and may turn him away from the more robust duties that he owes to whatever body of his fellow-men he may be able to reach and influence. His culture may become selfish, and selfish culture easily breeds the sense of superiority, the desire to avoid contact with the average man, that mark the sufferer from the disease of caste. Everywhere displeasing, the spirit of caste is peculiarly offensive in American society. If it arise from perverting the just pride that one may cherish in a line of honorable ancestors, it is snobbish; if it spring from the mere possession of wealth, it is vulgar; but if it rest upon a supercilious estimate of individual attainment, it takes on its most unlovely, and, I think, most dangerous form. For there is no place for arrogance in our society, and the true instinct of the people resents it bitterly. An exclusive class in America is an exasperating anomaly. This is the land of equal opportunity; no privilege should be allowed for a moment to influence the honorable struggle for success and advancement; and caste is based essentially upon privilege, either in the stage of defined custom or in the stage of more or less impertinent assertion.

In the direction of exclusiveness a young man, fresh from the somewhat contracted life of college, may easily be led to stray. I do not pretend to have had access to a peculiarly reliable source of information, but I nevertheless venture to affirm that the new born bachelor of arts may have a disproportionate sense of his own attainments and of his relative position in the universe. In the process of readjustment, which comes without much delay, he may find some friction and difficulty. Disappointment and discouragement may assail him, and as he looks back with

regret upon the smaller world where his position was visible and assured, he may be tempted to order his maturer conduct after a similar model—to retire upon himself, to tend toward disdainfulness, and to confine himself to a merely formal contact with the men and the affairs that seem at the moment to be harsh and alien. But this is a capital mistake. The way to power, influence, a conspicuous place in the world's eye—if this be the prize that allures—as well as the way to the highest and best development of the whole nature, lies through a true sympathy, through genuine interest in one's fellow-men. Every man may create such an interest if he does not feel it now, and may cultivate it until it becomes a constant and spontaneous flow of kindly feeling.

An example of the results that are possible if educated men should generally adopt such a rule of action, may be seen in many a small community, where all the children year after year are subjected to the unifying influence of training in the same public school. The interest in each other that is thus enforced bears later fruit in universal acquaintance and increased kindness, in mutual respect, in a thorough recognition of individual merit as the ground of distinction, and in greater readiness to co-operate for the common good. Such results will follow everywhere if the same influence of mutual interest is allowed free play; and they are already to be found in some measure throughout the land. They should be greatly more abundant, and they will be more abundant as the duty to advance this vastly important cause comes home to the conscience of our educated men. We hear sometimes of the envy to be found among a democracy. If the charge means, that envy exists among a democracy in a greater degree, or is directed against more numerous objects, than in other forms of society, I deny its accuracy; but in any event there is certainly little envy in America against culture and attainment. These desirable things are no doubt greatly longed

for by many who have them not; but they are so well known to be within the reach of industry and resolute purpose that envy is more like ardent desire, and there is in it little of grudging. There would be none, I think, if every educated man should from his young manhood cultivate a kindly bearing and a courtesy of speech; if he should seek to extend his acquaintance beyond the circle in which he happened to be born, and should be always ready with purse and pen and counsel to help on every good cause—to establish a library, to open a reading-room, to found a hospital, to forward any movement for making the average life better, brighter and easier to be borne. Neither does his duty stop short when it reaches political affairs. He is bound to have an opinion on public questions, and bound to express it upon proper occasion: he must do his part in the attack upon abuses wherever they may be found; he must help to purify and widen municipal life; he must share in making infamous the sale of a public trust for either money, or place, or power; and he must assist to arouse and instruct and fortify the public conscience, until in every community of our beloved land there reign a quick and wholesome spirit, and a civic pride justified by the knowledge that the people have at last made for themselves a dwelling place in no mean city.

For every educated man that is willing to live his life in some such fashion, there is a great and sure reward. Within, he will grow conscious of expanding powers, a wider outlook, a keener sympathy, a more tolerant judgment, a ripening wisdom; without, he will win at first the respect of his fellows, and afterwards a warmer sentiment as they come to see the unselfishness of his motives. He will be honored with the public confidence and become a leader in his sphere of action; he will help to mould opinion—moderating hasty impulse, pointing out danger and guiding to right judgment—and will thus perform his share of the work now most necessary for the American

people. For this people is in need of guidance. Many and serious problems, social, economical and political, are awaiting solution. Some *must* be solved if the nation is to endure. Among others, the long-standing quarrel between labor and capital over the distribution of the wealth they both create must be composed on the lasting basis of justice to both; bounds and regulations must be ordained for the commercial and industrial activity of the modern aggregations of wealth; above all else, there must be clean hands and an honorable life in the public service. Many of our serious questions are new in the world's history, and must be answered with little other aid from past experience than may be afforded by analogy, closer or more remote. In dealing with these difficulties, the educated man will be greatly trusted if—and only if—it is clearly seen that his knowledge is infused with a sympathetic spirit, and that in every fibre of his being he is true to the American ideals of equal opportunities, absence of privilege and of divisive class feeling, constant effort to elevate the mass, and increasing obligation upon the successful to advance the public good. I am convinced that much of the sneering tone, sometimes used concerning scholars and "closet polities" and "kid-gloved statesmen," is largely due to resentment at the real or supposed lack among educated men of sympathy with the average life and of interest in its cares and struggles.

Moreover, the nation seems to be approaching a stage in its development that may be full of momentous events. It is on the point of setting out upon a course comparatively unknown, where it may rightly fear disaster if it be not guided by extensive knowledge, by trained intelligence, by sober, statesmanlike judgment. To whom shall it look for direction, if not to its educated men? We have found it impossible to decline the obligations that rest upon the strong. Indeed, from the very beginning of our national life, we have never been able to occupy a position of com-

plete isolation, however much we may have favored it as desirable for the days of our youth. Washington's warning was against political connections with other nations, such as permanent alliances, because they were likely to be entangling, and from serious entanglement due to this cause or to any other we have hitherto kept ourselves free; but in some degree the movement of the world has always involved us, and now the irresistible current is sweeping us out upon the flood. We may not escape our destiny. Half unconsciously we have become a force to be reckoned with; and now the Power that ordains our lot compels us to take part, an unwilling and unwelcome player, in the great game where nations sit around the board. Our fortunate situation, facing the East and the West, but guarded by vast spaces of the sea, arouses the envy of the European concert, and no doubt those harassed nations would gladly see us bent down by the burdens and the anxieties that weigh upon them so heavily. From the load they carry we shall probably be always free; but from some part of it there seems to be no escape. At some cost of care and treasure, and alas! of brave, young life, we must acquit ourselves of the duties and responsibilities that spring from our position in the world. America is not called upon to be a knight-errant among the nations; but when a wrong confronts us within our power to right, when our conscience summons us to the decision, we may not shirk a duty otherwise clear, because we may find it needful to lay a restraining hand where restraint will be unwelcome.

The war that is now being waged illustrates this attitude with exactness. A people bent upon aggression, anxious to display its prowess or greedy for more extended rule, would long ago have cleared from the Caribbean Sea the belated remnant of a cruel and rapacious stock, the most detested power of the last four hundred years. But instead of hastening to a welcome struggle, the nation refused to stir until it was sure of its obligation. In spite of the

utterance of hot-headed men and violent journals ; in spite of the powerful influence to impulsive action, exerted by the fiery impatience with wrong and the passionate pity for the suffering that grew so strong during the time of waiting—in spite of every temptation to be precipitate, the nation made up its mind with deliberation, decided that a serious duty lay at its door, and then, with a sigh, but with no backward look, arose and addressed itself to the task. Thus far, there has been a notable gravity about this war, which must have struck the most careless observer. There have been spirit and earnestness in plenty, but the ardor of enthusiasm has been lacking ; no want of determination and courage, but an absence of zeal. To one whose memory goes back to the civil war, the difference has been marked. Then it was believed that the nation's very life was at stake, and straightway the fires of patriotism blazed forth. Who can forget those eager soldiers, impatient to be gone, the marching light in every eye, the battle-haste in each elastic step ? But now, a labor is laid upon us by our conscience ; and the troops have gone in a befitting spirit—quiet, serious and determined. Nevertheless, the cause we have taken up is so dear to our hearts, we love freedom so deeply and hate cruelty and oppression so intensely, that determination may easily become enthusiasm, and the glow of a serious purpose may yet spring up into the flame of passion.

What is to be the end of the course toward which the great ship is slowly veering ? No man may foretell ; but in the vaster outlook, while there is much that is dim and much that may be threatening, this at least grows clear to my eyes, and I think to the eyes of many more—the essential oneness of the English-speaking folk. I belong to the young, impressible generation that lived through the long distress of our civil strife, and I am sure I speak for many others as well as for myself when I declare that, rightly or wrongly, the years that have passed since Appomattox

have done little more than dull the keen sense of injury at the British aid and comfort that prolonged the struggle, and at the unconcealed hope (so it seemed) that we might forever be divided into jarring, feeble states. I know there was kindly feeling in many British hearts, but its voice was scarcely audible on this side of the ocean. Only rarely did any other tone than the tone of ill-will seem to reach our disappointed hearts. Such an experience leaves marks not easy to efface ; but what the mere lapse of time could not accomplish has come to pass before the outspoken heartiness of these recent days. Save for a few habitually discordant strains, we hear only the assurance of friendship ; and with that sound in my ears, I, for one, am ready to "forget the ancient wrong," and to stretch out a cordial hand to meet the proffered hand across the sea. And it cannot be doubted that many hearts more, warm again with the glow of kindly feeling, rejoice to believe that the shadow of estrangement has passed away. Fifty years ago, when England feared that the third Napoleon would seek to strengthen his new empire by forming a continental combination against her, a voice now forgotten cried to us across the Atlantic :

"Gigantic daughter of the West,
We drink to thee across the flood.
We know thee and we love thee best,
For art thou not of British blood ?
Should war's mad blast again be blown,
Permit not thou the tyrant powers
To fight thy mother here alone,
But let thy broadsides roar with ours.
Hands all around !
God the tyrant's cause confound !
To our kinsmen of the West, my friends ;
And the great name of England, round and round !"

If such a danger assailed England now, I take it to be certain that America would respond with promptness to a call for aid. Our hearts declare that we could not remain inactive while she struggled for her life. But we cannot be blind to the contingency that the peril may be, not hers, but ours. It is this possibility that is regarded in a homelier verse of the months just past: and if these lines express an abiding sentiment, the world may need to reckon with a force greater than any that has yet appeared.

“There’s writin’ as none will efface,
There’s a tie as no folly can loosen,
The tie between men of one race.
The orders as Nature has written
Can’t never be rubbed out again,
And the past, with its blunders and bloodshed,
Saws hard at that tie, but in vain.

And now, when the sky’s cloudin’ over,
The sound of the battle is near,
The voice of our race starts a-speakin’,
The hint as it offers is clear :
‘Friend Jonathan—s’posin’ you wants us—
Remember we’re here.’ ”

None will deny the influence of race; and if in these later generations we have ceased to be Anglo-Saxon and have become American, nevertheless we are proudest of the Saxon strain. It marks us ineffaceably, and impels us to a hearty approval of every movement toward a closer tie between those that speak the same tongue and are swayed essentially by the same great purposes. A formal alliance is not in my thought, nor in yours. For the present, it is enough to look only for friendship and mutual support in extremity; the future will bring its own counsel.

What might come of such a defensive understanding among the English-speaking peoples, falls within the domain of prophecy; but, if their future should be like

their past, justice would reign, and oppression and slavery and cruelty would come to an end, wherever the power of either nation might stretch. And I think, if the need arose for common action, the arm of the associates might be long. It is superfluous to sing the praise of British valor, and I shall not boast of our own. There is recent proof that this generation of Americans has not grown soft for the grim game of war. For resolute purpose, skill, dash, tenacity, cool daring, the men that made Manila bay and Santiago harbor forever memorable are fit companions for the seamen that carried the flag to victory on Lake Erie, on the coast of the Mediterranean, and off Scarboro Head. We too are the Vikings' sons, no less than our cousins oversea ; and, back to back, we care not for a continent in arms. It may be a dream—but even as a dream the vision is inspiring—of a time perhaps not distant when over much of the world it may be the noble and happy fortune of our kinsmen and ourselves to maintain the Anglo-American peace, and to cast an overwhelming influence on the side of freedom and justice in every sea that floats an American or a British keel.

It is these possibilities—grave, responsible, but elevating—that challenge the nation to a trial of powers of which it has hardly as yet made proof, and lay a fresh obligation on the conscience and capacity of its educated men.

One final word to the sons that leave their alma mater to-day. It is a parting, but not farewell. None know this better than your older friends and brothers. Those of us that look back through the mists of thirty years and more upon a scene like this behold a sight more fair than you can see. The life that holds you with a slowly loosening grasp is more charming to us than even to your ardent gaze; for in our eyes it shines with the radiance of our vanished youth, it glows with the lost effulgence of our early aspirations and ideals. For us, too, it is hallowed by sorrow. Across the years that have come and gone, we see

again the faces that shall never meet our earthly vision more, and we hear the eager voices now attuned to a harmony more divine. Once again we walk beneath the whispering elms in the dear comradeship of long ago, and dream the manly dreams that made the coming days so bright. Stronger even than your warm affection, is the bond that binds us to our foster-mother; for we still share with her youngest sons the inspiring traditions of past achievement, the sense of oneness with a splendid present, the confident outlook upon a future yet more glorious; and time has enabled us to add a clear and grateful recognition of the debt we owe to her faithful care, a better appreciation of her service to the cause of learning and to the community's common life, and a prouder estimate of her commanding station in the company of her peers. This heritage is yours and ours alike, whether we pay our homage here or to another mistress. It is the accident of circumstance that may divide our allegiance. Essentially all college men are one. It is the same spirit that binds each man to fealty where his early vows were paid, rejoiced if he may lay at his mother's feet the prize of some great endeavor, but sure at the least that he may swell her treasure by the legacy of duty done and life well lived.

"So be my passing,
My task accomplished and the long day done,
My wages taken, and in my heart
Some late lark singing,
Let me be gathered to the quiet west,
The sundown splendid and serene."

PROCEEDINGS OF THE CORPORATION.

At an adjourned meeting, held on May 24, 1898, the following business was transacted:

At the request of the Board of Public Education of the city of Philadelphia, the departments of the University

were opened without restriction to the allotment of the City Prize Scholarships. Nominations for a Trustee were received from the Central Committee of the Alumni. Mr. Francis Herman Bohlen was appointed Lecturer in Law in the Department of Law. The office of Dean of the Faculty Auxiliary to Medicine was abolished, and the Chairs of Medical Jurisprudence and Botany were placed under the control of the Faculty of Medicine as on the George B. Wood Foundation, the Chairs of Zoölogy and Mineralogy remaining unfilled. The resignation of Mr. Abram H. Wintersteen as Lecturer on Business Law and Practice in the College was accepted, with a vote of appreciation of his services in that office. Dr. Morris Jastrow, Jr., was elected Librarian of the University, thanks being tendered to him for his services as Acting Librarian for the past five months. Plans for the new Law School building were finally approved, and the architects authorized to prepare specifications and to secure bids.

At a stated meeting, held on Tuesday, June 7, 1898, the following business was transacted :

Votes of thanks were tendered to the Artists' Fund Society of Philadelphia for a valuable set of casts of antique cameos by Luigi Pickell; and to the Rev. Dr. Lyman Abbott, the Rev. Dr. Charles Wood, and to the officers of the Second Presbyterian Church, in connection with the University Sermon preached on Sunday, June 5. Mr. Samuel Frederick Houston was elected a Trustee of the University, on nomination of the Central Committee of the Alumni, to fill the vacancy caused by the death of the late Thomas McKean. The following appointments were made : University Scholarships in Botany, Zoölogy and Chemistry, respectively to Messrs. R. E. B. McKenney, J. R. Murlin and T. M. Taylor. The Provost, the Secretary, Professor W. P. Laird, Dr. W. F. Atlee and Dr. H. C.

Chapman were appointed a committee to erect monuments to Professors Nathaniel Chapman and Samuel Jackson, under the provisions of recent bequests. A Committee on University Publications, to consist of a representative of each association in the University issuing publications, was authorized. Adjourned to meet on Wednesday, June 9, to attend the Commencement.

COURSE OF LECTURES BY PROFESSOR CASPAR RENÉE GREGORY.

At the opening of the sessions of the University in the fall, a series of six lectures on New Testament criticism will be delivered in the College Chapel at 4 o'clock on the afternoons of October 3, 4, 6, 7, 10 and 11.

Peculiar interest attaches to these lectures, owing to the fact that the eminent scholar who is to deliver them, Professor Caspar Renée Gregory, LL. D., of the University of Leipzig, is a graduate of the College of the University of Pennsylvania of the class of 1864. Professor Gregory is the son of the late H. D. Gregory, LL. D., in former days principal of one of the most successful college preparatory schools in Philadelphia, and later for several years Vice-President of Girard College. After taking his degree of Bachelor of Arts, Professor Gregory taught for three years in his father's school, and studied theology in the Reformed Presbyterian Seminary in this city, and in Princeton Seminary, graduating at the latter in 1870. Professor Gregory subsequently went to Germany and studied in the University of Leipzig, where he took his doctor's degree in 1876. Since this time he has made Germany his residence, and has devoted himself to the study of New Testament Greek and Exegesis, making frequent trips to the more important scholastic centres and libraries of England and the Continent, for the purpose of examining more particularly their manuscript treasures bearing upon the text of the New Testament.

So important have been his investigations of these manuscript materials, and so ripe his scholarship in the estimation of all competent critics, that upon the death of the celebrated Tischendorf, Professor Gregory was entrusted with the important and

responsible task of bringing out the Prolegomena to Tischendorf's last edition of the New Testament, a work which the lamented editor had not lived to write. This work, when its first volume was published, sufficed to confirm the high opinion previously formed of the author's scholarship, and it was hardly a surprise, therefore, to the learned world to hear that, after having been *Privat Docent* in New Testament Exegesis in the University of Leipzig since 1884, he was, in 1889, made Professor Extraordinary of the same subject; and, in 1891, still further advanced to the dignity of Ordinary Honorary Professor. Besides his degree of Ph. D., Dr. Gregory has received from the University of Leipzig, in 1893, that of Dr. Theolog., and from the University of Pennsylvania that of LL. D., in 1894.

The following are the subjects of the lectures as above announced:

1. Greek Manuscripts: Paleography.
 2. Greek Manuscripts: Contents, Greek Liturgical Books.
 3. Versions.
 4. Church Writers.
 5. History of Criticism.
 6. Applied Criticism.
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ANNOUNCEMENTS FOR 1898-1899.

The College.

At a meeting of the Academic Council held on June 2, it was decided to offer two additional groups in the Junior and Senior years in the course in Arts and Science. These groups are numbered respectively XIV and XV, and are to be composed of the following subjects:

GROUP XIV—BOTANY-ZOÖLOGY.

Junior year	$\left\{ \begin{array}{l} \text{Botany} \\ \text{Zoölogy} \end{array} \right. \quad \begin{array}{l} 4 \text{ hours.} \\ 4 \text{ "} \end{array}$
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Senior year	$\left\{ \begin{array}{l} \text{Botany} \\ \text{Zoölogy} \end{array} \right. \quad \begin{array}{l} 5 \text{ hours.} \\ 5 \text{ "} \end{array}$
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GROUP XV—GEOLOGY-MINERALOGY.

Junior year	Mineralogy, 1 (Lectures) . . . 2 hours.
	Mineralogy, 3 (Laboratory) . . 2 "
	Geology, 1 (Laboratory) . . . 2 "
	Field work in Geology . . . - "
	Chemistry, Qual. Anal. . . . 6 "
	Assaying 2 "
Senior year	Mineralogy, 2 (Lectures) . . . 2 hours.
	Mineralogy, 4 (Laboratory) . . 2 "
	Geology, 3 (Lectures) . . . 2 "
	Field work in Geology . . . - "
	Chemistry, Quant. Anal. . . . 8 "
	Lithology 2 "

The details of these new groups will be arranged later, but their general constitution is as indicated.

Professor Edgar F. Smith will offer as a free elective to Juniors and Seniors in Arts and Science a Lecture Course in *Organic Chemistry*, one hour a week during the entire year.

Professor Morris Jastrow, Jr., will offer a course on *Hebrew Syntax*, one hour a week during the second term.

Philosophy.

FELLOWSHIPS AND SCHOLARSHIPS.

Through the efforts of the Alumnae and other students of the Department for Women, a new Graduate Fellowship for Women has been established, to be known as the "Alumnae Fellowship for Women." Its value will be not less than \$500 per annum, guaranteed for three years. It will be granted upon the following conditions:

The recipient must hold a baccalaureate degree given by some institution whose degrees are recognized by this University; she must have pursued graduate work successfully for at least one academic year, and must have a good reading knowledge of French and German. The appointment will be made annually by the Corporation upon the recommendation of the Executive Committee of the Department of Philosophy: the

holder will be twice eligible to re-appointment, and may be allowed, upon renewal, subject to the consent of the Faculty, to pursue her studies at any university here or abroad. While in attendance at this University, the Fellow will be required to reside in Bennett House; the tuition fee, and such sum for board and lodging as shall be fixed by the Board of Managers of the Graduate Department for Women, will be deducted from the total income of the Fellowship as long as the student is resident at this University; the balance will be paid to the Fellow. While resident at other universities the total income will be paid to the Fellow.

NEW COURSES.

The graduate work in American Constitutional History, which has been conducted by Professor F. N. Thorpe, will, in consequence of his resignation, be in the hands of Dr. H. V. Ames during the year 1898-99.

Dr. William N. Bates, who has been absent in Greece during the current year, will resume his work in October, 1898, and will give the course on Pausanias' *Periegesis*, which he had intended to give this year.

During Dr. Fullerton's absence in Europe the Rev. Edmund T. Shanahan, D. D., Ph. D., Associate Professor of Philosophy at the Catholic University of America, Washington, D. C., will give a course of lectures in the graduate school, upon Mediæval Philosophy.

The Department of History announces the following new courses:

IX B 14—An introductory course in Methods of Historical Research.

(a) Dr. Howland, one hour, one term.

(b) Assistant Professor Munro, one hour, one term.

NOTE: IX B 9—Paleography, Diplomatics and Bibliography, will be made a one-term course and will be limited to Paleography and Diplomatics. Course IX B 15 will take the place of the second term's work.

IX B 16—Historical Construction, Professor Cheyney, two hours.

For Course VIII A 2—History of Modern Ethics, Assistant Professor Newbold will probably substitute a course on the Græco-Roman Ethics of the Post-Aristotelian Period.

Professor Patten, who has been absent on leave during the past year, will resume his work in Economics, October, 1898.

Group III. It is intended to make the following changes in the courses in Indo-European Philology during the year 1898-99:

III 2—Sanskrit for beginners, two hours, will be divided into two one-hour courses, both of which will be based upon Whitney, *Grammar*, and Lauman, *Reader*, but one, III 2 a, will be intended for those who have as yet had no Sanskrit, while the other, III 2 b, will presuppose a.

Course III 3—Advanced Sanskrit, two hours, will be expanded into two courses, III 3 a, Rig-Veda, one hour, and III 3 b, Rig-Veda continued, Hindu Philosophy, the Sankhya System, Bhagvadgita.

REORGANIZATION OF GRADUATE COURSES IN EUROPEAN HISTORY.

The Graduate Courses in European History have been reorganized, and will be given next year as follows. The grouping is based, not on the subjects treated, but on the objects sought in the respective courses. These groups will be four in number.

I. Courses intended more especially to provide students with the proper equipment for advanced historical study. Dr. A. C. Howland will read with the students, during the first term, a mediæval Latin chronicle, mainly for the purpose of training in the use of the language. During the second term, Professor D. C. Munro will give instruction in the process of analyzing a document, to determine date, authorship, and similar critical questions. A course in Bibliography, running through the year, will also be given. During the first term, Professor Munro will deal with the general historical reference books and periodicals, and the specifically mediæval collections. In the second term, Professor E. P. Cheyney and Dr. Whitecomb will take up the bibliography of English, and of Modern History, respectively. Professor Munro will give a course for one term

in Paleography and Diplomatics, intended for advanced students making a specialty of Mediæval History.

II. Analytical seminars, intended more particularly to give training in the process and methods of historical investigation, as follows:

Professor Cheyney: English Constitutional History from the eleventh to thirteenth centuries (alternating in odd years with a course in English Economic History from the thirteenth to sixteenth centuries).

Professor Munro: The Crusades.

Dr. Whitcomb: The French Revolution (alternating in odd years with a course on the Period of the Reformation).

III. Lecture courses, intended more especially to convey information on the various subjects indicated.

Professor Cheyney: Relations between England and the Continent during the fourteenth and fifteenth centuries.

Professor Munro: The First Six Centuries of Church History (alternating in odd years with a course on Church History, 600-1300).

(NOTE.—A number of undergraduate courses also are available for the objects of this group, but cannot, under the rules, be counted as part of the amount of work requisite for a higher degree.)

IV. A seminar course, the object of which is training in methods and form of historical production. This course will be under the direction of Professor Cheyney, and will include the preparation and criticism of papers representing original investigation of narrowly defined subjects; discussions of the treatment of such questions in secondary works; and book reviews. The subjects will be drawn mainly from the History of England during the Reformation.

THESES.

"The following theses were presented to the Faculty by candidates for the degree of Ph. D. at the Commencement of 1898:

1. "The Rise of Formal Satire in England under Classical Influence," Raymond Macdonald Alden.
2. "Metal Separations by Means of Hydrobromic Acid Gas. Indium in Tungsten Minerals," Elizabeth Allen Atkinson. (Printed.)

3. "The Temporal Privileges of the Crusaders," Edith Bramhall.
4. "The Primary Election System in Philadelphia," Walter Jacob Branson.
5. "Mental Association," Jacob Franklin Byler.
6. "A Study in the Rise of English Lollardry," Henry Lewin Cannon.
7. "A Study of the Igneous Rocks of York Haven and Stony Brook, Pa., and Their Accompanying Formations," Frederick Ehrenfeld.
8. "Thomas Lodge as a Dramatist," Margaret Emma Nicholas Fraser.
9. "Mental Association," Oscar Gerson.
10. "Electrolytic Reductions," William Mason Grosvenor, Jr.
11. "The Development of Ischnochiton," Harold Heath.
12. "Saint Augustine, His Life and Doctrine," Theodore Heysham.
13. "A Discussion of the Business Documents of Murasu Sons, Bankers and Brokers of Nippur," Simon Koppé.
14. "The Atomic Mass and Derivatives of Selenium," Victor Lenher. (Printed.)
15. "Reconstruction under President Lincoln," Charles Hallan MacCarthy.
16. "Derivatives of the Tetrahalides of Zirconium, Thorium and Lead," Joseph Merritt Matthews. (Printed.)
17. "Individualism in Education," Jesse Hamor Michener.
18. "The Synonyms of the Unclean and the Clean in Hebrew," Pezavia O'Connell.
19. "On the Mathematical Theory of the Geometric Chuck," Edward Anson Partridge.
20. "The Relation of State and Municipality to Pawn-Broking in Europe and in the United States," William Rolla Patterson.
21. "The Quantitative Determination of Boric Acid in Tourmaline," George William Sargent. (Printed.)
22. "Hindu Logic as Preserved in China and Japan," Sadajiro Sugiura.
23. "The Atomic Mass of Tungsten and the Preparation of Sodium Pertungstate by Means of the Electric Current," George Edward Thomas.

24. "The Buildings of Nebuchadnezzar," James Turley Van Burkallow.

APPOINTMENTS.

Edgar Arthur Singer, Jr., Ph. D. (Penna., 1894), who has been for two years Senior Fellow in Philosophy, has been appointed Instructor in Philosophy.

Thomas Harrison Montgomery, Jr., Ph. D. (Berlin, 1894), who has held the University Fellowship in Invertebrate Zoölogy for the year 1897-98, has been appointed Instructor in Zoölogy.

Law.

Professor C. S. Patterson will retire on September 1. Mr. Francis Herman Bohlen, a graduate of the class of 1892 and a Fellow in the Department during 1893, 1894 and 1895, has been elected Lecturer. Mr. Bohlen will assist Judge Dallas in Torts, besides giving an elective course on Damages two hours a week for a term; and an elective course on Negligence two hours a week for a term. The Senior Fellow, Mr. Joseph Gilfillan, who has this year conducted the course on Crimes, will next year conduct also the third-year course on Property, devoting practically his entire time to the Department.

Professors George Wharton Pepper and G. S. Patterson both increase the amount of their work in the Department. Professor Pepper will extend his course on Partnership to the second-year class from two hours for a term to two hours per week for the entire year. His courses on Corporations and Insurance remain each two hours a week throughout the year as heretofore. Professor G. S. Patterson takes Professor C. S. Patterson's course on the Constitution of the United States. He also retains his courses on Bills and Notes, Quasi-Contracts, and Pleading. Mr. W. H. Carson, Lecturer, will offer next year a course on the Conflict of Laws, one hour a week for a term, in addition to his course on Carriers. The courses on Equity will be entirely rearranged. The next first-year class in Equity will take a course on the general principle of Equity Jurisdiction, and Equity as applied to Torts; that is, Trespass,

Waste and Nuisance. The course on Trusts will constitute the Equity of the second year. The third-year class will have an opportunity to elect a course on Equity as applied to Contracts; that is, Specific Performance, Revision and Reformation. The Dean will have charge of all these courses. Professor Bispham, much to the gratification of the members of the Faculty, has consented either to give a course on the origin of the High Court of Chancery and the fundamental principles of Equity Jurisprudence, or a course on Pleading and Practice in Equity.

Messrs. Owen J. Roberts and Roy W. White, Fellows elected out of the graduating class of 1898, will devote their entire time to such teaching as may be assigned to them, and to original legal research.

The George and Algernon Sydney Biddle Library now numbers over twenty thousand volumes, the increase during the year being over six thousand. This collection, taken in connection with the complete series of Session Laws now in the general library of the University, gives the University as fine a collection of legal works as exists in Pennsylvania.

The plans for the new building of the Department at Thirty-fourth and Chestnut streets have been approved by the Corporation, and orders given to the architects, Messrs. Cope & Stewardson, to proceed at once with the detailed drawing and erection of the building. As finally adopted the plans call for a two-story building, 200 by 115 feet. The ground floor will contain the executive offices of the Department, conversation, club and quiz rooms, besides one lecture hall having a seating capacity of two hundred and fifty; another holding two hundred, three holding one hundred, and two holding fifty students, besides a Practice Court Room, Prothonotary's Office, etc., for the practice department. The second floor is devoted exclusively to the Library. In the centre is the book stack, which has a capacity for over one thousand books. Off the stack is McKean Hall, and another large reading room for the under-graduate students. These halls having a seating capacity at separate tables of nearly six hundred. Also connected with the stack is a large room, 40 by 50 feet, which is to be exclusively devoted to the use of persons engaged in original

legal research. The professors' studies, eight in number, and Librarian's room are connected with this advance reading room and the stack. The Corporation has limited the cost of the building to three hundred thousand dollars. The style of architecture represents the period of William and Mary.

Medicine.

The first floor of the Laboratory building, formerly used by the Dental Department, which was partitioned off and used partly as a Physiological Laboratory and partly as a room for teaching Bandaging and Operative Surgery, will be re-partitioned during the summer so as to enlarge the space for the Physiological Laboratory. Two rooms will thus be provided for the use of the Laboratory of Pharmacodynamics; and also a small room, with seats arranged in an amphitheatre, to accommodate about seventy-five persons, in which demonstrations in Physiology and Pharmacodynamics can be made. The practical work in Bandaging and in Operating Surgery will be performed in the room now used as a bicycle room. It is expected that provision will be made for bicycles in another room in Medical Hall.

By action of the Faculty of Medicine, Pharmacodynamics has been made a major Elective study of the fourth year of the course.

PERIODICALS RECEIVED BY THE UNIVERSITY LIBRARY.* ACADEMIES.

Académie Impériale des Sciences, St. Petersburg. *Annales.*
American Philosophical Society. *Proceedings.*

—*Transactions.*

Asiatic Society of Bengal. *Journal.*
—*Proceedings.*

Berichte des Freien Deutschen Hochstiftes. Frankfurt, A. M.
Institut de France: Académie des Inscriptions et Belles Lettres.

—*Mémoires.*

—*Mémoires par divers Savants.*

—*Comptes rendus.*

—*Académie des Sciences. Comptes rendus.*

Kaiserliche Akademie der Wissenschaften, Vienna. *Sitzungsberichte.*

Königlich Bayerische Akademie der Wissenschaften, Munich.
Sitzungsgberichte der philos.-philol. histor. classe.

Königliche Gesellschaft der Wissenschaften, Göttingen, *Nachrichten.*
—*Gelehrte Anzeigen.*

Königlich Preussische Akademie der Wissenschaften, Berlin.
Sitzungsberichte.

Smithsonian Institution. *Annual Report.*

—*Contributions to Knowledge.*

—*Bureau of Ethnology. Annual Report.*

—*Miscellaneous Collections.*

Upsala Universitets Årsskrift.

BIBLIOGRAPHY, LIBRARY ECONOMY.

Allgemeine Bibliographie, Monatliches Verzeichnis.

Allgemeine Bibliographie für Deutschland.

American and English Annual Catalogue.

* This list includes only the Periodicals at present received in the Library. A supplementary list, including the Periodicals in the Library that have ceased to appear, will be published in a subsequent number of the BULLETIN.

- Annual Library Index to Periodical Literature.
Bibliographie de la France.
Bibliographie der Deutschen Zeitschriften-Literatur.
Bollettino delle Pubblicazioni Italiane.
Book News—Book Reviews.
Bookman (London).
Bookman (New York).
Bookseller, Newsdealer and Stationer.
Centralblatt für Bibliothekswesen.
—Beiblatt.
Cumulative Index.
Deutsche Litteraturzeitung.
English Catalogue of Books.
Library.
Library Journal.
Public Libraries.
Publisher's Circular.
Revue des Bibliothèques.
Revue Internationale des Archives des Bibliothèques et des Musées.
Stechert's Monthly List.
Wöchentliches Verzeichnis der Neuigkeiten des ^{am} Deutschen Buchhandels.

GENERAL.

- Academy.
Allgemeine Zeitung.
American.
Atlantic Monthly.
Athenaeum.
Blackwood's Edinburgh Magazine.
Citizen.
Contemporary Review.
Cornhill Magazine.
Cosmopolis.
Critic.
Cultura.
Deutsche Rundschau.

- Dial.
Edinburgh Review.
Fortnightly Review.
Forum.
Gentleman's Magazine.
Lippincott's Magazine.
Literarisches Centralblatt.
Literary Era.
Literary News.
Literary World.
Littell's Living Age.
London, A Weekly Newspaper.
Longman's Magazine.
Macmillan's Magazine.
Nation.
New England Magazine.
New Review.
Nineteenth Century.
North American Review.
Notes on New Books.
Notes and Queries.
Nuova Antologia.
Poet-Lore.
Preussische Jahrbücher.
Public Opinion.
Quarterly Review.
Review of Reviews.
Revue Bleue.
Revue Critique d'Histoire et de la Littérature.
Revue de Paris.
Revue des Deux Mondes.
Revue du Monde Catholique.
Saturday Review.
Spectator.
Temple Bar.
Twentieth Century.
Westermann's Illustrierte Deutsche Monatshefte.
Westminster Review.

THEOLOGY—RELIGION.

- American Catholic Quarterly Review.
 American Ecclesiastical Review.
 American Journal of Theology.
 Archiv für Religionswissenschaft.
 Biblical World.
 Bibliotheca Sacra.
 Catholic World.
 Civiltà Cattolica.
 Critical Review of Theological and Philosophical Literature.
 Dublin Review.
 Expositor.
 Expository Times.
 Hartford Seminary Publications.
 Hartford Seminary Record.
 Jewish Quarterly Review.
 Journal of Biblical Literature.
 Month.
 Occult Review.
 Open Court.
 Progress.
 Revue de l'Histoire des Religions.
 Revue des Etudes Juives.
 Theologisch Tijdschrift.
 Theologische Literaturzeitung.
 Theologische Studien und Kritiken.
 Theologisches Literaturblatt.

PHILOSOPHY.

- Année Philosophique.
 Archiv für Geschichte der Philosophie.
 Archiv für systematische Philosophie.
 Cause.
 Intelligence (formerly Metaphysical Magazine).
 International Journal of Ethics.
 Journal of Speculative Philosophy.
 Monist.
 Philosophical Journal.
 Philosophical Magazine.

- Philosophical Review.
Philosophisches Jahrbuch.
Revue de Metaphysique et de Morale.
Revue Néo-Scolastique.
Revue Philosophique de la France et de l'Etranger.
Rivista Italiana di Filosofia.
University of Chicago. Contributions to Philosophy.
Vierteljahrsschrift für Wissenschaftliche Philosophie.
Zeitschrift für Exakte Philosophie.
Zeitschrift für Immanente Philosophie.
Zeitschrift für Philosophie und Philosophische Kritik.

PSYCHIATRY.—MENTAL PATHOLOGY.—HYPNOTISM.

- American Journal of Psychology.
American Journal of Insanity.
Archiv für Psychiatrie und Nervenkrankheiten.
Archivio di Psichiatria Scienze Penali ed Antropologia Criminale.
Annales des Sciences Psychiques.
Année Psychologique.
Archives d'Anthropologie Criminelle.
Brain.
Child Study Monthly.
Journal of Mental Science.
Kinderfehler.
Mind.
Pedagogical Seminary.
Philosophische Studien.
Psychological Review.
Revue de l'Hypnotisme.
Society of Psychical Research. Proceedings.
University of Iowa. Studies in Psychology.
Yale University. Studies from the Psychological Laboratory.
Zeitschrift für Psychologie und Physiologie.
Zeitschrift für Hypnotismus.

PHILOLOGY—GENERAL AND COMPARATIVE.

- American Journal of Philology.
American Philological Association. Transactions.
—Proceedings.

Beiträge zur Kunde der Indogermanischen Sprachen.

Indogermanische Forschungen.

Mémoires de la Société de Linguistique de Paris.

Revue de Linguistique et de Philologie Comparée.

Verhandlungen Deutscher Philologen und Schulmänner.

Zeitschrift für Vergleichende Sprachforschung.

Zeitschrift für Vergleichende Litteraturgeschichte.

ORIENTAL LANGUAGES.

American Journal of Semitic Languages and Literature.

American Oriental Society. Journal.

Beiträge zur Assyriologie.

Journal Asiatique.

Orientalische Bibliographie.

Orientalistische Litteratur Zeitung.

Recueil de Travaux Relatifs à la Philologie Egyptienne et Assyrienne.

Revue d'Assyriologie et d'Archéologie Orientale.

Revue Sémitique.

Royal Asiatic Society. Journal.

Wiener Zeitschrift für die Kunde des Morgenlandes.

Zeitschrift der Deutschen Morgenländischen Gesellschaft.

Zeitschrift für Assyriologie.

Zeitschrift für Alttestamentliche Wissenschaft.

CLASSICAL LANGUAGES.

Archiv für Lateinische Lexikographie.

Berliner Philologische Wochenschrift.

Bibliotheca Philologica.

Classical Review.

Cornell Studies in Classical Philology.

Harvard Studies in Classical Philology.

Hermathena.

Hermes.

Jahrbücher für Classische Philologie.

Jahresbericht über die Fortschritte der Classischen Alterthumswissenschaft.

Journal of Hellenic Studies.

Journal of Philology.

- Leipziger Studien zur Classischen Philologie.
Mnemosyne.
Neue Jahrbücher für das Klassische Altertum, Geschichte und
Deutsche Litteratur und für Pädagogik.
Neue Philologische Rundschau.
Nordisk Tidsskrift for Filologi.
Philologus.
Revue de Philologie.
Rheinisches Museum für Philologie.
Rivista di Filologia.
University of Wisconsin. Bulletin. Philology and Literature
Series.
Wiener Studien für Klassische Philologie.
Wochenschrift für Klassische Philologie.

MODERN LANGUAGES.

- Archiv für das Studium der Neueren Sprachen.
Die Neueren Sprachen.
—Beiblatt: Phonetische Studien.
Harvard Studies in Philology and Literature.
Litteraturblatt für Germanische und Romanische Philologie.
Modern Language Association. Publications.
Modern Language Notes.
Modern Quarterly of Language and Literature.
Neuphilologische Rundschau.

ROMANIE.

- Revue des Langues Romanes.
Revue Hispanique.
Revista Lusitana.
Romania.
Romanische Forschungen.
Studj di Filologia Romanza.
Zeitschrift für Romanische Philologie.
Zeitschrift für Französische Sprache.

ENGLISH.

- Anglia.
Dialect Notes.
Englische Studien.

GERMAN.

- Acta Germanica.
 Alemannia.
 Americana Germanica.
 Arkiv för Nordisk Filologi.
Beiträge zur Geschichte der Deutschen Sprache und Literatur.
Biographisches Jahrbuch.
Euphorion.
 —Ergänzungsblatt.
Forschungen zur neueren Litteraturgeschichte.
Germanisches National Museum. Anzeiger.
 —Mitteilungen.
 —Kataloge der Sammlungen.
Jahrbuch des Vereins für Niederdeutsche Sprachforschung.
Jahresbericht der Germanischen Philologie.
Jahresberichte für Neuere Deutsche Litteraturgeschichte.
Journal of Germanic Philology.
Mittheilungen der Deutschen Gesellschaft in Leipzig.
Mittheilungen der Gesellschaft für Deutsche Sprache in Zürich.
Quellen und Forschungen.
Quellen und Forschungen zur Geschichte, Literatur und Sprache Oesterreichs.
Theatergeschichtliche Forschungen.
Tijdschrift voor Nederlandsche Taal-en Letterkunde.
University of Chicago. Germanic Studies.
Zeitschrift des Allgemeinen Deutschen Sprachvereins.
 —Anzeiger Beilage.
Zeitschrift für den Deutschen Unterricht.
Zeitschrift für Deutsche Philologie.
Zeitschrift für Deutsches Altertum.

HISTORY—GEOGRAPHY.

- American Catholic Historical Society Record.
 American Historical Magazine.
 American Historical Register.
 American Historical Review.
 American Jewish Historical Society. Publications.
 Annals of Iowa.

- Anzeiger für Schweizerische Geschichte.
Archiv für Litteratur und Kirchengeschichte.
Archivalische Zeitschrift.
Archivio Storico Italiano.
Archivio Storico Lombardo.
Baltische Studien.
Bibliothèque de l'Ecole des Chartes.
Boletin de la Real Academia de la Historia.
Byzantinische Zeitschrift.
Colonial Tracts.
Courrier du Livre, Canadiana.
Current History.
Deutsche Zeitschrift für Geschichtswissenschaft.
English Historical Review.
Forschungen zur Brandenburgischen und Preussischen Geschichte.
Geographical Journal.
Globus.
Harvard Historical Magazine.
Historische Zeitschrift.
Historisches Jahrbuch.
Jahresbericht der Geschichtswissenschaft.
Johns Hopkins University. Studies in Historical and Political Science.
Mitteilungen aus der Historischen Litteratur.
Mitteilungen des Instituts für Oesterreichische Geschichtsforschung.
Moyen Age.
Neues Archiv der Gesellschaft für Aeltere Deutsche Geschichtskunde.
Nouvelle Revue Historique.
Pennsylvania German Society. Publications.
Pennsylvania Magazine of History and Biography.
Petermann's Mitteilungen.
—Ergänzungshefte.
Revista Critica de Historia y Literatura.
Revolution Française.
Revue d'Histoire Diplomatique.
Revue Historique.

Revue de l'Orient Latin.

Revue des Questions Historiques.

Royal Historical Society of Great Britain. Transactions.

Royal Geographical Society. Proceedings.

Schriften des Vereins für Meiningische Geschichte und Landeskunde.

Schriften des Vereins für Reformationsgeschichte.

Translations and Reprints from the original Sources of European History.

Texas State Historical Association Quarterly.

William and Mary College Quarterly Historical Magazine.

Zeitschrift des Vereins für Thüringische Geschichte und Altertumskunde.

Zeitschrift für Kirchengeschichte.

Zeitschrift für Kulturgeschichte.

ARCHÆOLOGY.

American Journal of Archæology.

Archæological Institute of America. Papers.

Archæological Journal.

Bulletin de Correspondance Hellénique.

Bonner Jahrbücher.

Ephemeris Archaiologike.

Mittheilungen und Nachrichten des Deutschen Palaestina Vereins.

Palestine Exploration Fund. Quarterly Statement.

Peabody Museum of Archæology and Ethnology, Memoirs.

—Papers.

—Reports.

Revue Archéologique.

Society of Biblical Archæology. Proceedings.

—Transactions.

Westdeutsche Zeitschrift.

—Korrespondenzblatt.

Zeitschrift des Deutschen Palaestina Vereins.

ANTHROPOLOGY, ETHNOLOGY, FOLKLORE.

American Anthropologist.

Anthropologie, l'

Archiv für Anthropologie.

Correspondenzblatt.

Archivio per l'Antropologia e la Etnologia.

Anthropological Institute of Great Britain and Ireland.
Journal.

Beiträge zur Anthropologie und Urgeschichte Bayerns.

Berliner Gesellschaft für Anthropologie, Ethnologie und Urge-
schichte:

—Zeitschrift für Ethnologie.

—Verhandlungen.

—Nachrichten über Deutsche Altertumsfunde.

Internationales Archiv für Ethnographie.

Journal of American Folk Lore.

Mittheilungen der Deutschen Gesellschaft für Natur- und Völ-
kerkunde Ostasiens in Tokio.

Revue Mensuelle de l'Ecole d'Anthropologie de Paris.

Zeitschrift des Vereins für Volkskunde.

SCIENCE.—GENERAL.

American Academy of Arts and Sciences. Proceedings.

American Association for the Advancement of Science. Pro-
ceedings.

American Journal of Science.

British Association for the Advancement of Science. Pro-
ceedings.

California Academy of Sciences. Proceedings.

Connecticut Academy of the Arts and Sciences. Transactions.

Franklin Institute. Journal.

Imperial University of Japan. Journal of the College of Sci-
ence.

Jenaische Zeitschrift für Naturwissenschaft.

Kansas University Quarterly.

London, Edinburgh and Dublin Philosophical Magazine and
Journal of Science.

National Academy of Sciences. Memoirs.

Nature.

Nova Scotia Institute of Science. Proceedings and Trans-
actions.

Popular Science Monthly.

- Canadian Institute. Proceedings.
 Royal Society. Proceedings.
 Field Columbian Museum. Publications.
 Revue Scientifique.
 Science.
 Texas Academy of Science. Transactions.
 United States National Museum. Annual Reports.
 —Bulletins.
 University of Wisconsin. Bulletin. Science Series.
 United States Patent Office.—Gazette.

PHYSICS.

- Annalen der Physik und Chemie.
 —Beiblätter.
 Bulletin de la Société Physique de Paris.
 Digest of Physical Tests.
 Fortschritte der Physik.
 Journal de Physique.
 Light.
 Nuovo Cimento.
 Physical Review.
 Physical Society of London.—Proceedings.
 Séances de la Société Française de Physique.
 Terrestrial Magnetism.
 Verhandlungen der Physikalischen Gesellschaft zu Berlin.
 Zeitschrift für den Physikalischen und Chemischen Unterricht.
 Zeitschrift für Instrumentenkunde.
 Zeitschrift für Comprimirte und Flüssige Gase.

CHEMISTRY.

- Analyst.
 Annalen der Chemie.
 Annales de Chemie et de Physique.
 Bulletin de la Société Chemique de Paris.
 Chemical News.
 Chemiker Zeitung.
 Chemische Industrie.
 Chemisches Central-Blatt.

- Gazzetta Chimica Italiana.
Jahresbericht über die Fortschritte der Chemie.
Journal für Praktische Chemie.
Journal of Physical Chemistry.
Chemical Society (London) Journal.
Monatshefte für Chemie.
Shurnal Russkalo Physiko-Chemicheskalo Obschestva.
Society of Chemical Industry, Journal.
Zeitschrift für Analytische Chemie.
Zeitschrift für Physikalische Chemie.

METEOROLOGY—GEOLOGY—MINERALOGY.

- American Geologist.
Bulletin de la Société Française de Mineralogie.
Monthly Weather Review.
New York Meteorological Observatory.
Neues Jahrbuch für Mineralogie, Geologie und Palaeontologie.
Geological Society of America, Bulletin.
—Publications.
Geological Magazine.
Journal of Geology.
Tschermak's Mineralogische und Petrographische Mitteilungen.
United States Geological Survey.
—Bulletins.
—Monographs.
—Reports.
Zeitschrift für Krystallographie und Mineralogie.

BIOLOGY.

- American Academy of Natural Sciences. Proceedings.
American Naturalist.
Année Biologique.
Archiv für Entwickelungsmechanik der Organismen.
Archiv für Mikroskopische Anatomie und Entwicklungsgeschichte.
Archives de Biologie.
Biological Society of Washington. Proceedings.

Concilium Bibliographicum.

Journal of Morphology.

Leland Stanford University. Contributions to Biology.

Marine Biological Association. Journal.

Morphologisches Jahrbuch.

Quarterly Journal of Microscopical Science.

Zeitschrift für Wissenschaftliche Mikroskopie.

BOTANY.

Annales des Sciences Naturelles Botaniques.

Annals of Botany.

Beiträge zur Biologie der Pflanzen.

Berichte der Deutschen Botanischen Gesellschaft.

Botanical Gazette.

Botanical Magazine.

Botanische Zeitung.

Botanisches Centralblatt.

Flora oder Allgemeine Botanische Zeitung.

Jahrbücher für Wissenschaftliche Botanik.

Just's Botanischer Jahresbericht.

Minnesota Botanical Studies.

Revue Générale de Botanique.

Torrey Botanical Bulletin.

Zeitschrift für Pflanzenkrankheiten.

ZOOLOGY.

Mittheilungen aus der Zoologischen Station zu Neapel.

Mittheilungen aus der Zoologischen Sammlung des Museums
für Naturkunde.

Museum of Comparative Zoology. Memoirs.

—Bulletin.

Verhandlungen der K. K. Zoologisch- Botanischen Gesell-
schaft in Wien.

Zeitschrift für Wissenschaftliche Zoologie.

Zoological Record.

Zoologische Jahrbücher.

Zoologischer Anzeiger.

Zoologischer Jahresbericht.

ASTRONOMY.

Astronomical Journal.

Astronomical Society of the Pacific. Publications.

- Astronomische Nachrichten.
Astronomisches Jahrbuch.
Astrophysical Journal.
Observatory.
Popular Astronomy.
Royal Astronomical Society. Monthly Notices.
Vierteljahrsschrift der Astronomischen Gesellschaft.
Yale University. Transactions of the Astronomical Observatory.

MATHEMATICS.

- Acta Mathematica.
American Journal of Mathematics.
Annals of Mathematics.
Bibliotheca Mathematica.
Bulletin des Sciences Mathématiques.
Jahrbuch über die Fortschritte der Mathematik.
Journal de Mathématiques.
Journal für die Reine und Angewandte Mathematik.
Mathematical Magazine.
Mathematical Visitor.
Mathematische Annalen.
Messenger of Mathematics.
Nouvelles Annales de Mathématiques.
Quarterly Journal of Mathematics.
Zeitschrift für Mathematischen und Naturwissenschaftlichen Unterricht.

ENGINEERING.

- American Electrician.
American Engineer, Car Builder and Railroad Journal.
American Machinist.
American Railway Master Mechanic Association. Proceedings.
American Society of Civil Engineering. Proceedings.
—Transactions.
American Society of Municipal Improvements.
American Society of Railroad Superintendents. Reports of Proceedings.
American Street Railway Association. Reports of Proceedings.

- American Water Works Association. Proceedings.
Annales des Mines.
Association of Engineering Societies. Journal.
Association of Railway Superintendents of Bridges and Buildings. Proceedings.
Bulletin of International Railway Congress.
Canadian Society of Civil Engineers.
Cassier's Magazine.
Compressed Air.
Dingler's Polytechnisches Journal.
Eclairage Electrique.
Electrical Engineer.
Electrical World.
Electrician.
Eletricien.
Electricity.
Elektrotechnische Zeitschrift.
Engineer (English).
Engineers' Club of Philadelphia. Proceedings.
Engineers' Society of Western Pennsylvania. Proceedings.
Engineering (English).
Engineering and Mining Journal.
Engineering Magazine.
Engineering News.
Engineering Record.
Helios.
Institution of Civil Engineers. Minutes of Proceedings.
Iron Age.
Journal de l'Ecole Polytechnique.
Mining Bulletin.
Municipal Engineering.
New England Railroad Club. Proceedings.
New England Roadmasters' Association. Proceedings.
New England Water Works Association. Journal.
New York Railroad Club.—Proceedings.
Power and Transmission.
Railroad Gazette.
Railway Age.
Railway Review.

Railway World.
Roadmasters' Association of America. Proceedings.
Street Railway Journal.
Transactions.
Transport.
Western Railway Club.
Western Society of Engineers. Journal.

MANUFACTURES.

American Carpet and Upholstery Journal.
American Manufacturer and Iron World.
Manufacturers' Record.
National Association of Wool Manufacturers.—Bulletin.
Textile Record.
Wool and Cotton Reporter.

AGRICULTURE—FORESTRY—GARDENING.

American Agriculture.
American Farmer.
American Forestry Association. Proceedings.
Annales de la Société d'Agriculture.
Bulletin des Séances de la Société Nationale d'Agriculture
de France.
Forest Leaves.
Forester.
Garden and Forest.
Gardeners' Chronicle.

ARCHITECTURE—ARTS.

American Architect and Building News.
Architect.
Architektonische Rundschau.
Architectural Association. Sketch Book.
Architectural Record.
Architectural Review.
Architecture and Building.
Arte Italiana.
American Journal of Photography.
British Architect.

- Brickbuilder.
 Brochure Series Architectural Illustration.
 Builder.
 Building News.
 California Architect.
 Classical Picture Gallery.
 Encyclopédie d'Architecture.
 Inland Architect.
 International Studio.
 Materiaux et Documents d'Architecture et de Sculpture.
 Photographic Times.
 Royal Institute of British Architects. Journal.
 —Proceedings.
 Southern Architect.

POLITICAL ECONOMY.—POLITICAL SCIENCE.

- Allgemeine Bibliographie der Staats- und Rechtswissenschaften.
 American Academy of Political and Social Sciences. Annals.
 American Economic Association. Publications.
 Annales de l'Ecole Libre des Sciences Politiques.
 Economic Journal.
 Economic Review.
 Economic Studies.
 Economiste.
 Giornale degli Economisti.
 Jahrbücher für Nationalökonomie und Statistik.
 Journal of Political Economy.
 Political Science Quarterly.
 Quarterly Journal of Economics.
 Revue d'Economie Politique.
 Revue Economique de Bordeaux.
 Untersuchungen zur Deutschen Staats- und Rechtsgeschichte.
 Yale Review.
 Zeitschrift für die Gesamte Staatswissenschaft.
 Zeitschrift für Staats- und Volkswirthschaft.

SOCIOLOGY.

- American Journal of Sociology.
 Annales de l'Institut International de Sociologie.

Charities Review.

Journal of Sociology.

Revue Internationale de Sociologie.

Rivista Internazionale di Scienze Sociali.

Rivista della Beneficenza Pubblica.

STATISTICS.

Allgemeines Statistisches Archiv.

American Statistical Association. Quarterly Publications.

Annuaire Statistique de la France.

Beiträge zur Morbiditäts Statistik Bayerns.

Bulletin de Statistique.

Journal de la Société de Statistique de Paris.

Monthly Summary of Finances and Commerce of United States.

Royal Statistical Society. Journal.

Sound Currency.

Repertoire des Travaux de la Société de Statistique de Marseille.

Statistische Monatschrift.

Vierteljahrshefte zur Statistik des Deutschen Reichs.

Zeitschrift des Königlich Bayerischen Statistischen Bureau.

Zeitschrift des Königlich Preussischen Statistischen Bureaus.

Zeitschrift des Königlich Sächsischen Statistischen Bureaus.

Zeitschrift für Schweizerische Statistik.

LAW.—ADMINISTRATION.—CIVICS.

Albany Law Journal.

Annalen des Deutschen Reichs für Gesetzgebung.

Archiv für Oeffentliches Recht.

Archiv für Soziale Gesetzgebung und Statistik.

Barristers' Magazine.

Canada Law Journal.

Cape Law Journal.

Catalogue of United States Public Documents.

Central Law Journal.

Centralblatt für das Deutsche Reich.

City and State.

City Record.

- Civil Service Bulletin.
 Civil Service Chronicle.
 Civil Service Record.
 Commercial Lawyer.
 Congressional Record.
 Gesetz-Sammlung für die Königlichen Preussischen Staaten.
 Good Government.
 Harvard Law Review.
 Insurance Law Journal.
 Ministerial Blatt für die gesammte innere Verwaltung in den
 Preussischen Staaten.
 Municipal Affairs.
 United States Government Publications.
 Zeitschrift der Savigny-Stiftung für Rechtsgeschichte.
 Zeitschrift für das Privat und Öffentliche Recht.

COMMERCE—FINANCE.

- Archiv für Eisenbahnwesen.
 Board of Trade Journal.
 Bankers' Magazine.
 Boston Journal of Commerce.
 Commercial and Financial Chronicle.
 Finanz Archiv.
 Greater Japan.
 Monatliche Nachweise über den Auswärtigen Handel.
 Monthly Bulletin of the Bureau of the American Republics.

EDUCATION.

- Allgemeine Deutsche Lehrerzeitung.
 —Feuilleton Beilage.
 Anzeiger für die Neueste Pädagogische Literatur.
 Association of Colleges and Preparatory Schools of the
 Middle States and Maryland. Proceedings of Annual
 Conventions.
 Blätter für das Gymnasial Schulwesen.
 Bollettino Ufficiale del Ministerio dell'Istruzione Pubblica.
 Catholic University. Bulletin.
 Chronicle.

- Centralblatt für die Gesammte Unterrichts Verwaltung in Preussen.
Columbia University Bulletin.
Education.
Educational Foundations.
Educational News.
Educational Review.
Educational Times.
Harvard Graduates' Magazine.
Hochschul Nachrichten.
Intelligence.
Journal of Education.
Journal of Pedagogy.
Johns Hopkins University Circulars.
Jahresberichte über das höhere Schulwesen.
Jugendschriften Warte.
Ohio Educational Monthly.
Pennsylvania School Journal.
Pädagogisches Archiv.
Revue de l'Instruction Publique.
Revue Universitaire.
School Gazette.
School Journal. New York and Chicago.
Verhandlungen der Direktoren Versammlungen in den Provinzen des Königreichs Preussen.
Zeitschrift für das Gymnasialwesen.
Zeitschrift für die Oesterreichischen Gymnasien.
Zeitschrift für die Reform der Höheren Schulen.

MILITARY AND NAVY.

- Cavalry Association Journal.
U. S. Naval Institute Proceedings.

ATHLETIC.

- American Athlete.

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Series in Mathematics.

University Bulletin (monthly).

Unofficial.

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Pennsylvanian.

Red and Blue.

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